

Meeting Potable Reuse for Florida and Beyond

**Bart Weiss, P.G.,
Past President and
National Board of Directors**



**Director,
Reclaimed Water and Discharge Elimination Division
Hillsborough County Public Utilities Department**

6/5/2017

CLEAN THE WATER
SAVE YOURSELF
SAVE YOURSELF
CLEAN THE WATER



Edition: U.S. ▼

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LIVE

COMING UP 4:35 PM: AIG Lawsuit Victory... With An Asterisk

COMING UP WEDNESDAY: Top Stories For Wednesday, June 1

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Rich Californians Balk At Water Limits: 'We're Not All Equal'

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California Orders Major Water Cuts For Farmers

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State Rep Blames California Drought On Abortion

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Lake Oroville near the Bidwell Marina on 20 July, 2011.

The Enterprise Bridge passes over a section of Lake Oroville that is nearly dry on 19 August, 2014.

Lake Oroville at 32% of its total capacity.





OVER 500 FRESH DEALS WEEKLY

SPOTLIGHT

Home

California landlords pass along water bills to coax apartment dwellers to conserve

Poll: Californians more worried than ever about drought

SAVING WATER

Wild sight: Watch crazy goat stampede as herd released from UC Berkeley lab

California drought good for businesses that paint lawns green

East Bay water district will sue to fight state cutoff

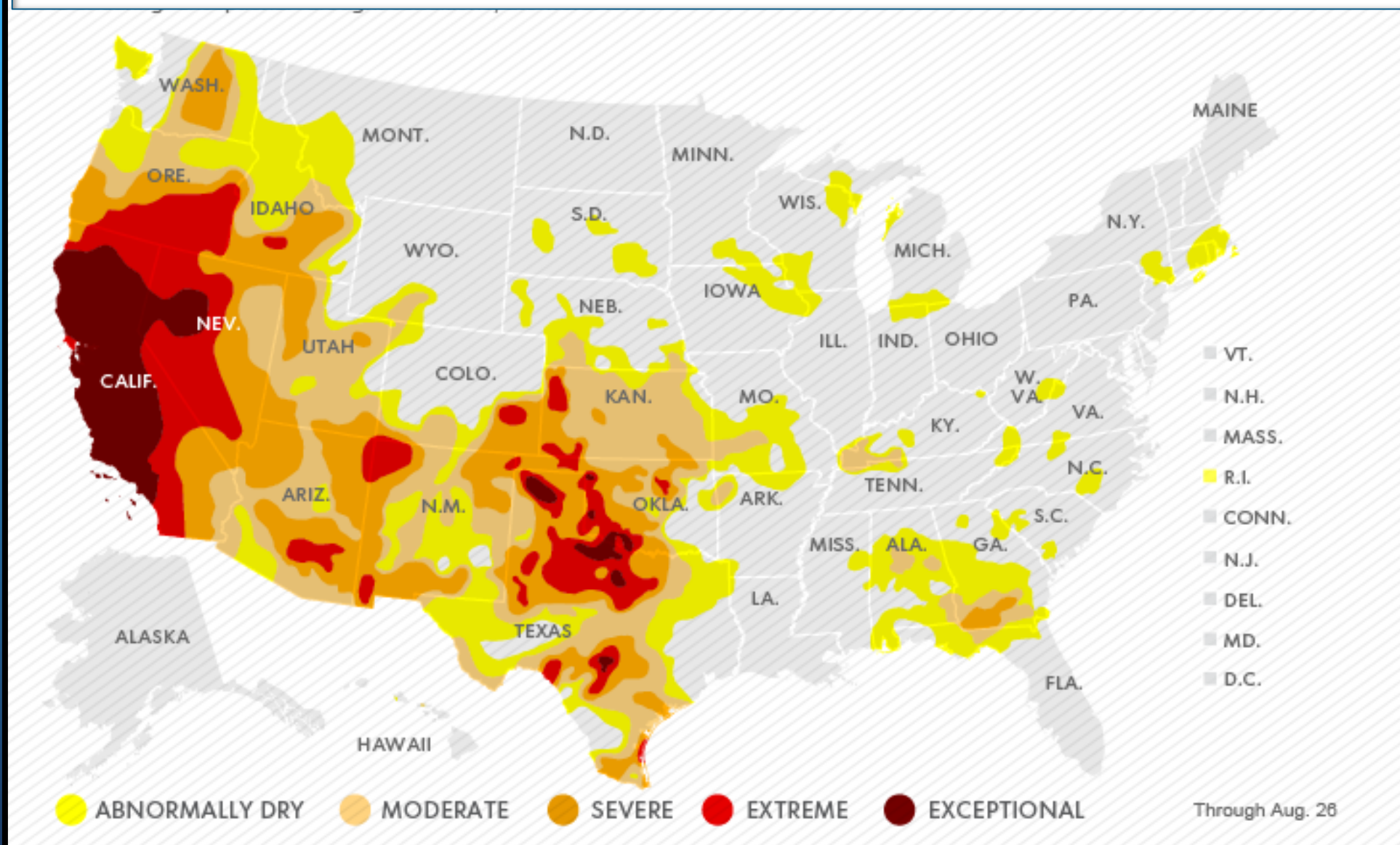
Rural Byron-Bethany Irrigation District will sue state water managers to halt water restrictions, claiming that the drought-management plan for users in the crucial Sacramento-San Joaquin River Delta will destroy thousands of acres of crops, eliminate jobs and cut off water to the 15,000 residents of the suburban town of Mountain House.

Working toward a drought-proof water supply



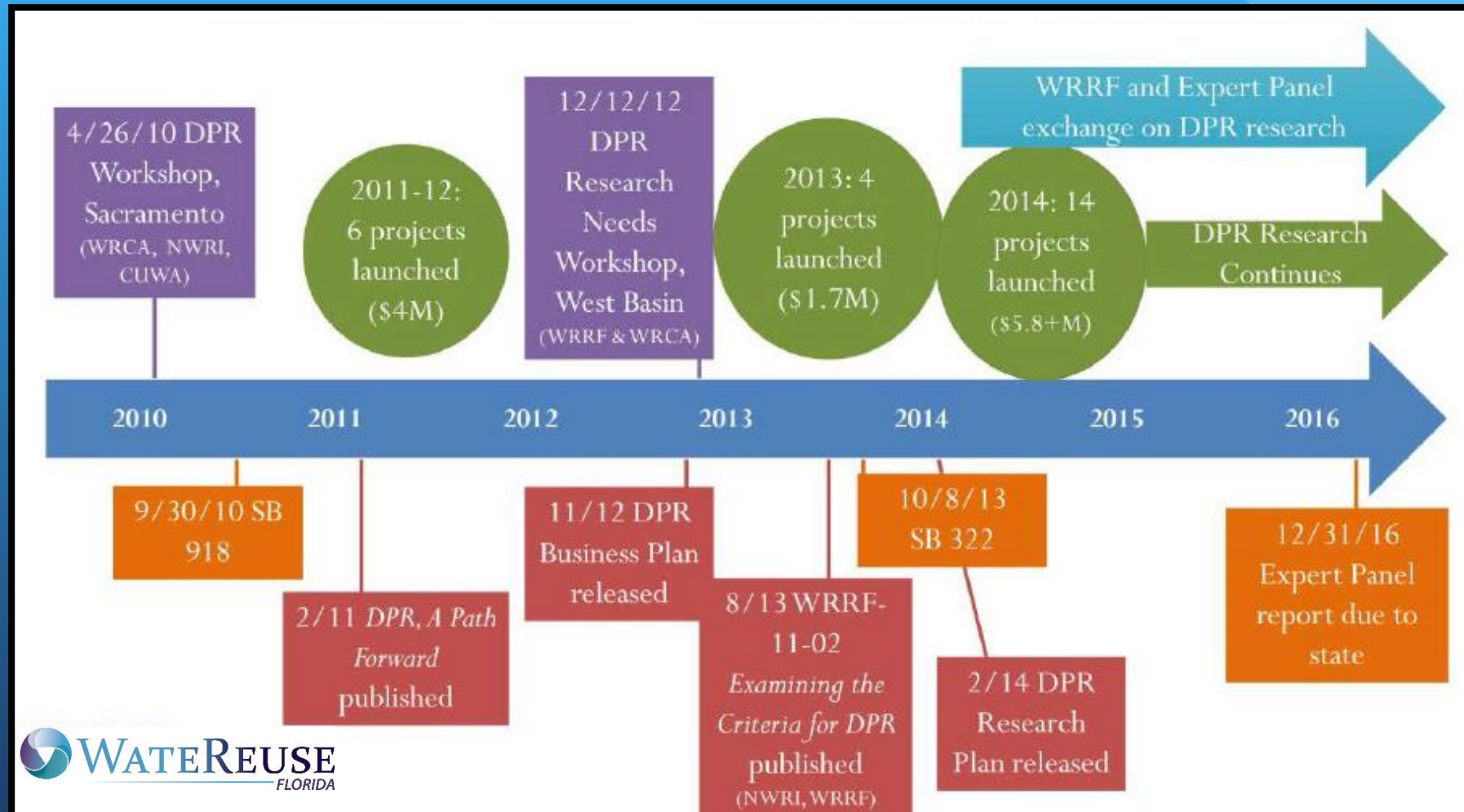
Here in Santa Clara County, we get our water from a variety of sources: the Sierra Nevada watersheds, local rainfall and water conservation.

Necessity Driving Technology in the Western States





California Progression



The Texas state flag is displayed on the left side of the slide. It features a white five-pointed star centered on a blue vertical field, which is adjacent to a horizontal field divided into white (top) and red (bottom) sections.

**Texas has an answer
to the drought!**

Reuse

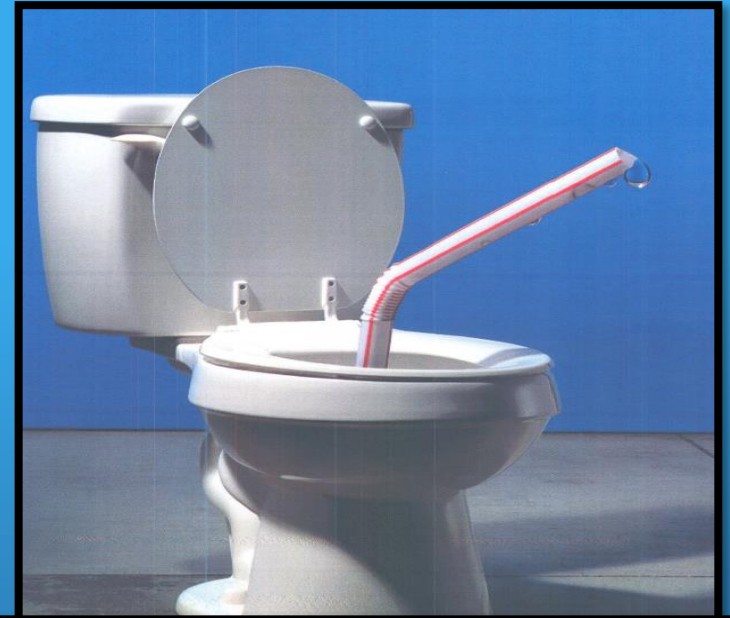
Water-Reuse Ideas Go Forward, Despite 'Toilet to Tap' Concerns

By AUDREY WHITE FEB. 7, 2013



The Cypress Water Treatment Plant in Wichita Falls. Brandon Thibodeaux for The Texas Tribune

Potable Reuse In the News



CBSNEWS

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"Toilet to tap" wastewater recycling begins in Texas city



FRANCK FIFE/AFP/GETTY IMAGES

Wastewater Recycling

SUSTAINABILITY Bottoms

Treated sewage could be the safest, most environmentally sound source of tap water yet—if we can get over the yuck factor

By Olive Heffernan

ON A SUNNY DAY IN DECEMBER, I VISIT A SHINY, STERILE WATER-PROCESSING facility nestled in the hills of northern San Diego. Sheltered by an ugly cream-colored roof but lacking walls, the workings of this over-size chemist's laboratory glisten in the warm winter sun. Visible from every angle are rows of silver tubes and canisters of various shapes and sizes and great gray metal vats of concealed liquid. As my tour of the small plant comes to a close, I am presented with a

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OPINION

EDITORIALS

The yuck factor: **Get over it**

By **U-T San Diego Editorial Board** MIDNIGHT JAN. 23, 2011

PRINT

COMMENTS **0**



As San Diego sprawls above 3.5 million people countywide in just 10 more years, and a projected 4.4 million by 2050, the greatest threat to our economic health and quality of life is an uncertain supply of water. This urban cul-de-sac at the bottom of California is at the tail end of the pipelines that deliver 80 percent or more of our water. That means we are heavily dependent on the mercy of others, and that is not comforting.

186 Million years

0.2 million years

(ABOUT ONE PIXEL WIDE)

ERA OF HUMANS

Mesozoic Era

(ERA OF THE DINOSAURS)

CENOZOIC

ERA

(ERA OF MAMMALS)

**252 MILLION
YEARS AGO**

T I M E L I N E

<https://www.youtube.com/watch?v=KK64Dqply0s>

TODAY

Texas Leads the Nation in Potable Reuse

Texas DPR Project Treatment Schemes

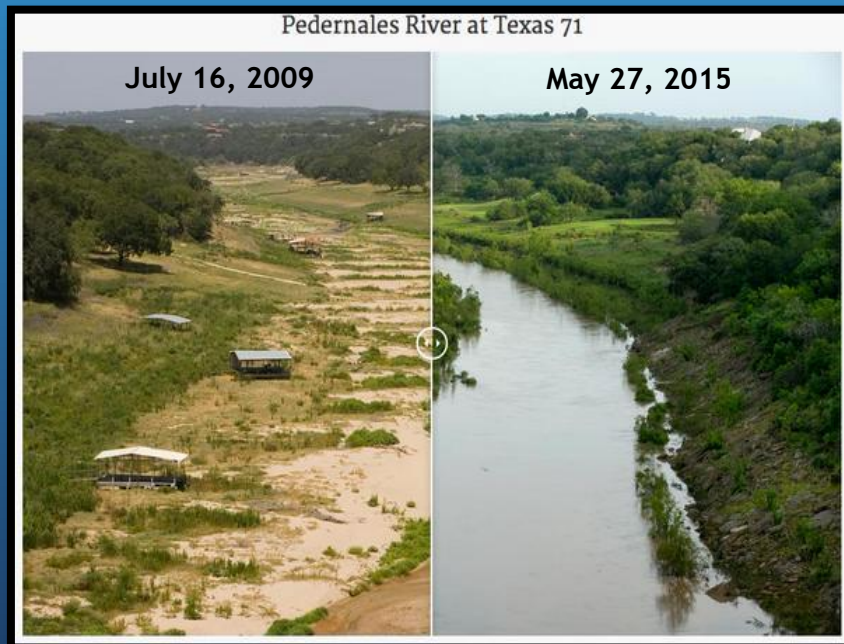
Project	Direct to Distribution System	Advanced Treatment	Capacity (into AWT) MGD
CRMWD (Big Spring)	No	MF/RO/UV-AOP	2.5
Wichita Falls	No	MF/RO/UV	7.5
El Paso	Yes	MF/NF or RO/ UV-AOP	10
Laguna Madre WD	No	MF/RO/UV-AOP	0.7
San Angelo	No	UF/RO/UV-AOP	9
Brownwood	Yes	UF/UV/RO/GAC/UV	1.5



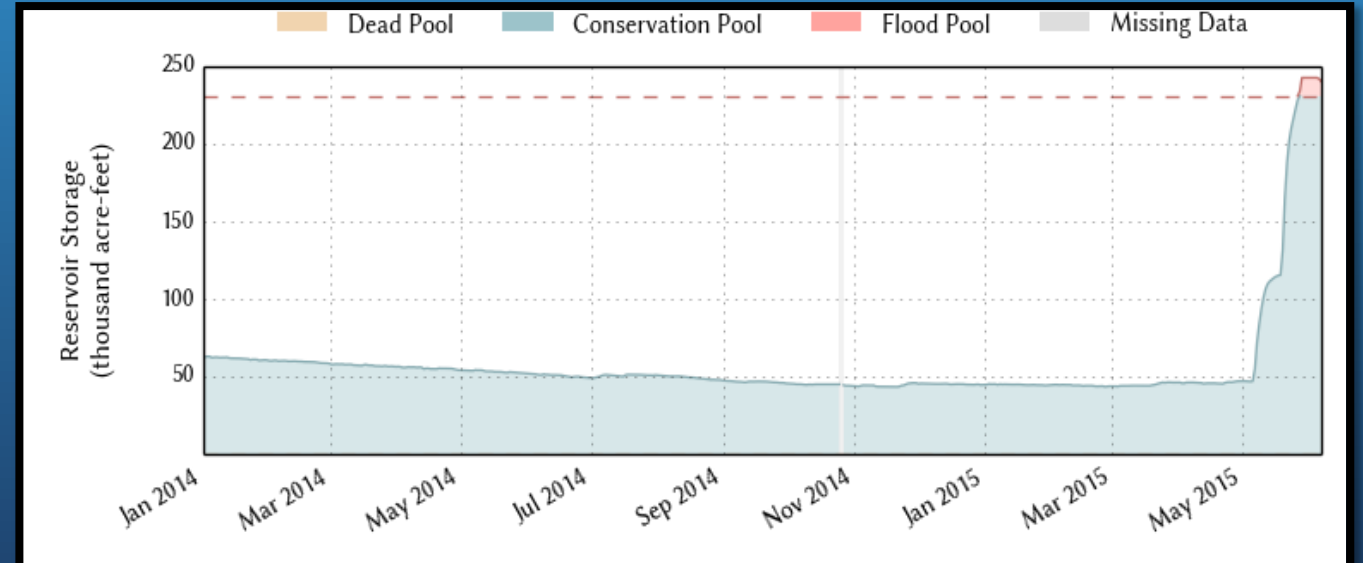
What a difference a month makes!



Lake Arrowhead, Wichita Falls



Source: Austin American Statesman

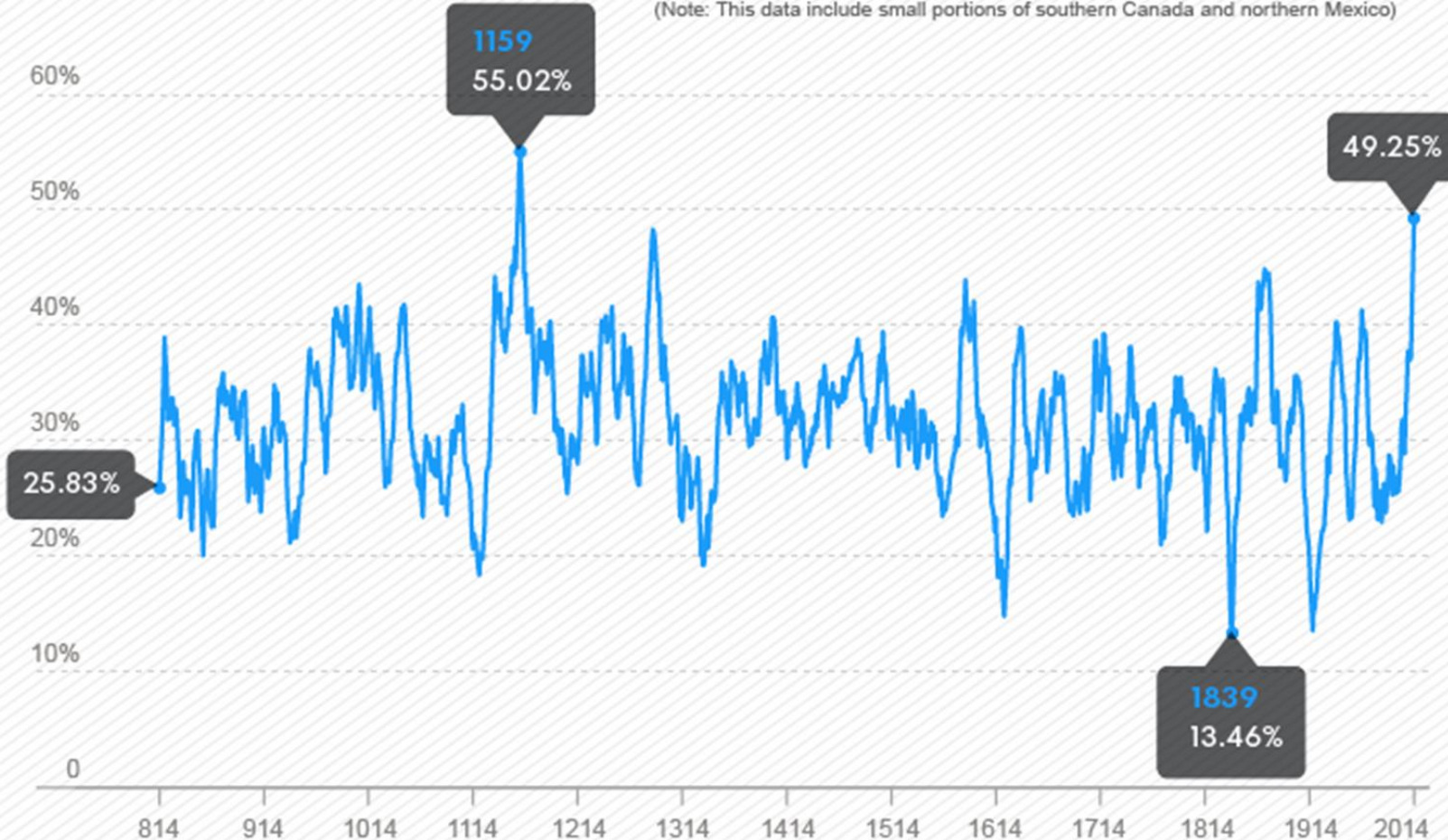


Is the drought overfor now.....?

PAST DROUGHTS

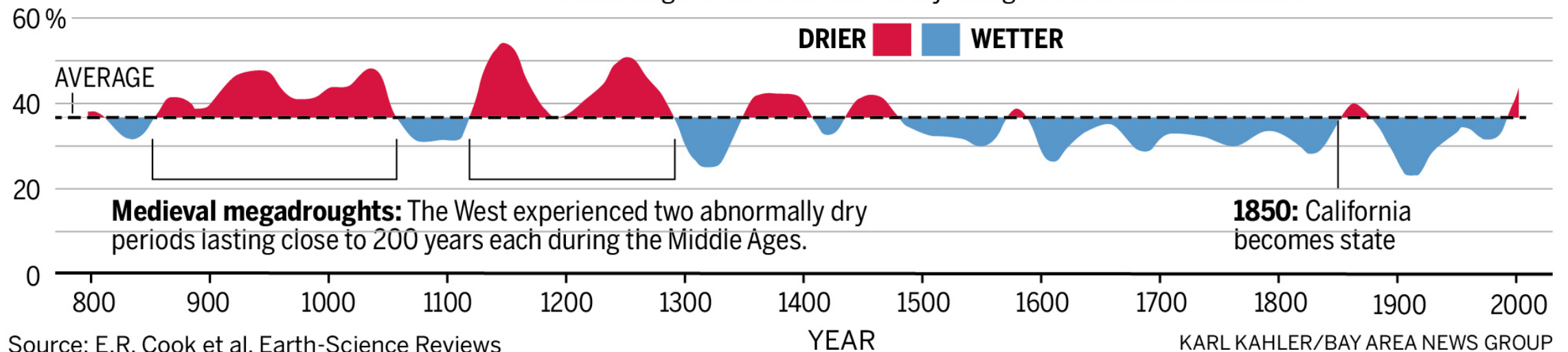
This graph shows the percentage of western North America that's been in a drought since 814. More of western North America has persistently been in a drought during the past 15 years than at any other 15-year period since the 1150s and 1160s.

(Note: This data include small portions of southern Canada and northern Mexico)



A 200-year drought?

Evidence from tree rings shows that drought was historically much more widespread in the American West than now, while the 20th century was wetter than normal. Percentage of the West affected by drought from 800 A.D. to 2000:



Source: E.R. Cook et al, Earth-Science Reviews

KARL KAHLER/BAY AREA NEWS GROUP

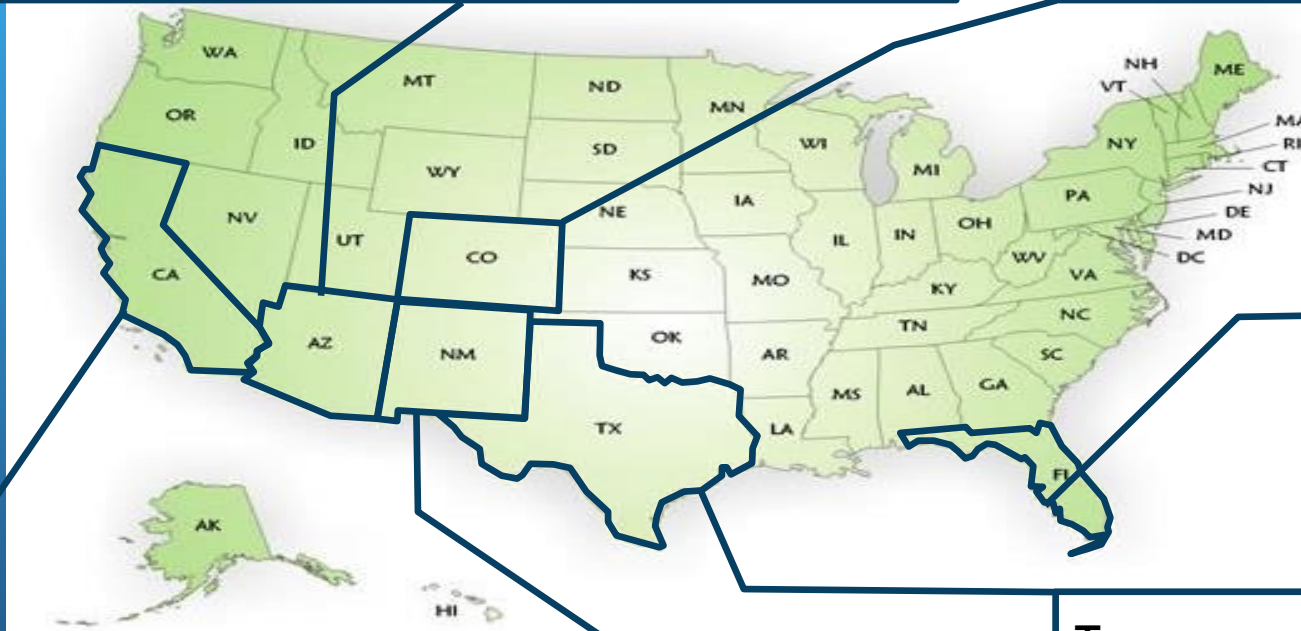
Potable Reuse Progress

Arizona

Steering Committee on Arizona Potable Reuse

Colorado

Potable Reuse White Paper



Florida

- WaterReuse Florida Potable Reuse Workshop for Elected Officials
- SB536
- Clearwater Demonstration Project
- Altamonte Springs DPR Proposal
- Numerous IPR Projects

Texas

- Project(s) in Operation
- Framework in Development

California

- DPR Initiative
- Feasibility Report due in 2016

New Mexico

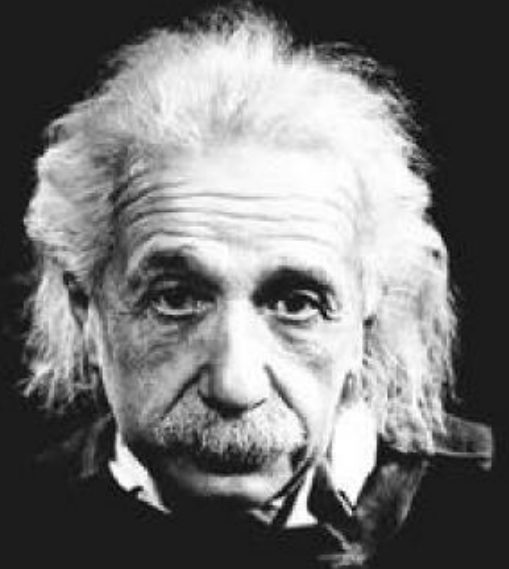
Advisory Panel for DPR Operations

The general public has difficulty with the concept of relative concentrations and risk

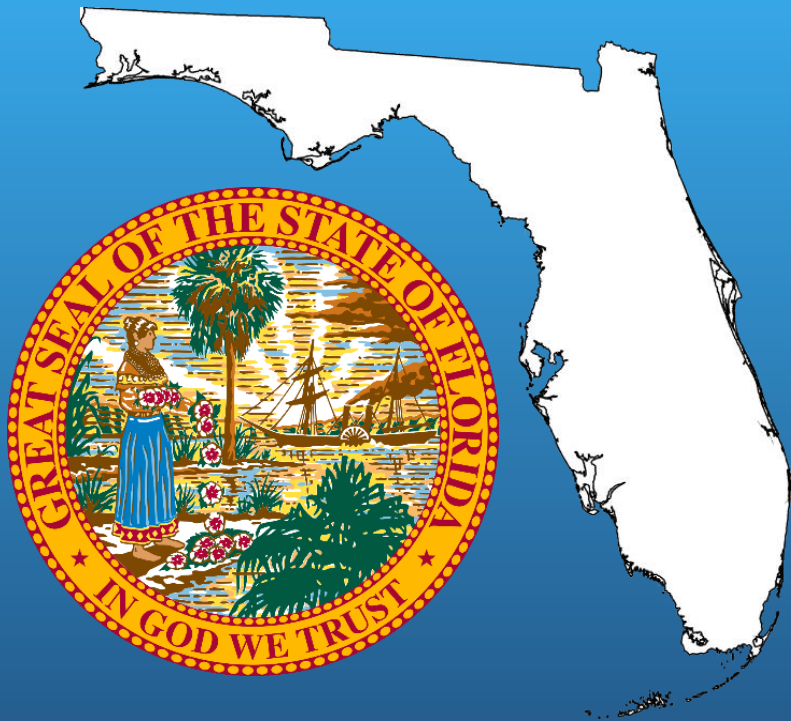
- There is a concern that “presence” in any amount is a problem.
- Adverse health effects are presumed if anything can be detected.
- There is no “zero” of anything... including risk.

“Not everything that counts can be counted, and not everything that can be counted counts.”

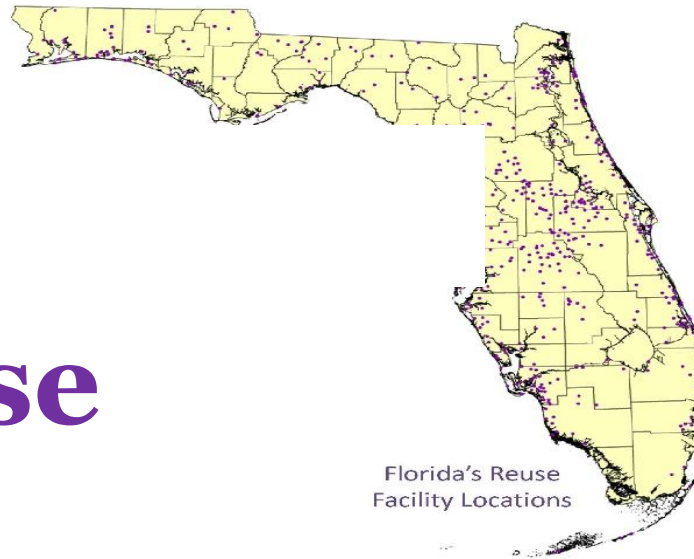
-Albert Einstein



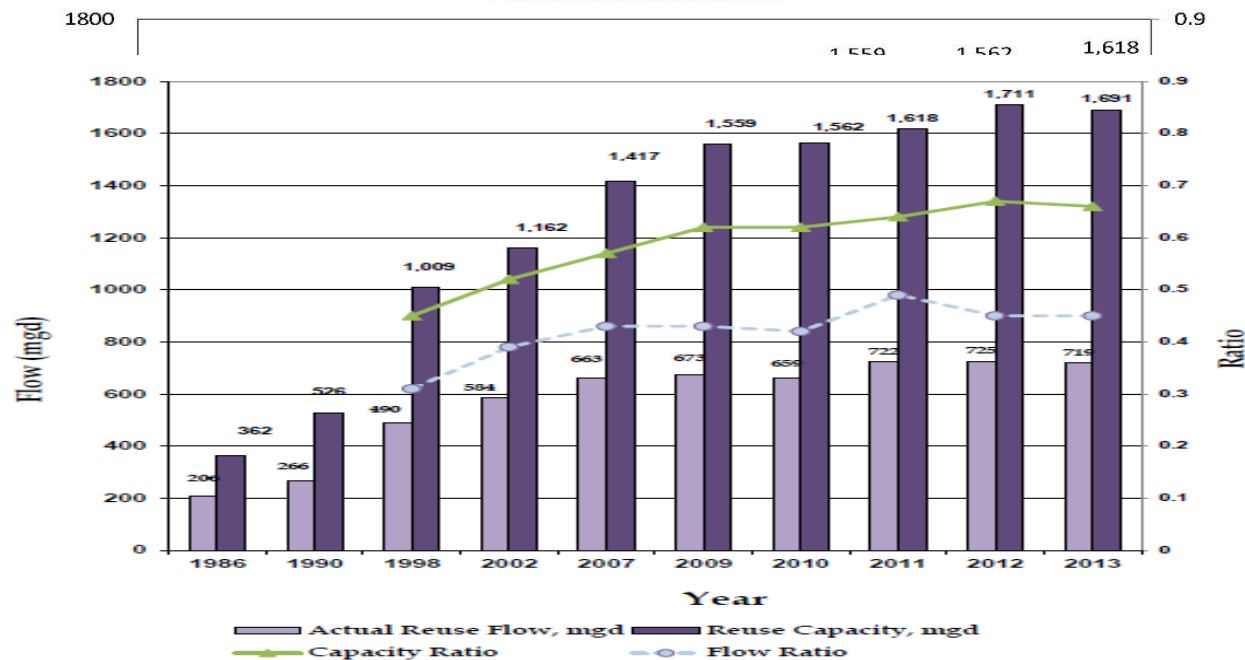
Florida & 2016 WaterReuse Perspective



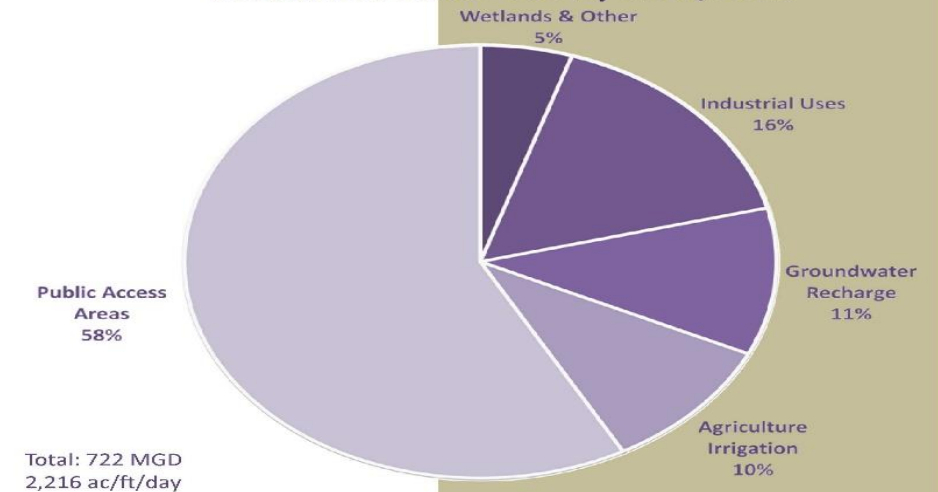
Florida Is #1 in Reuse



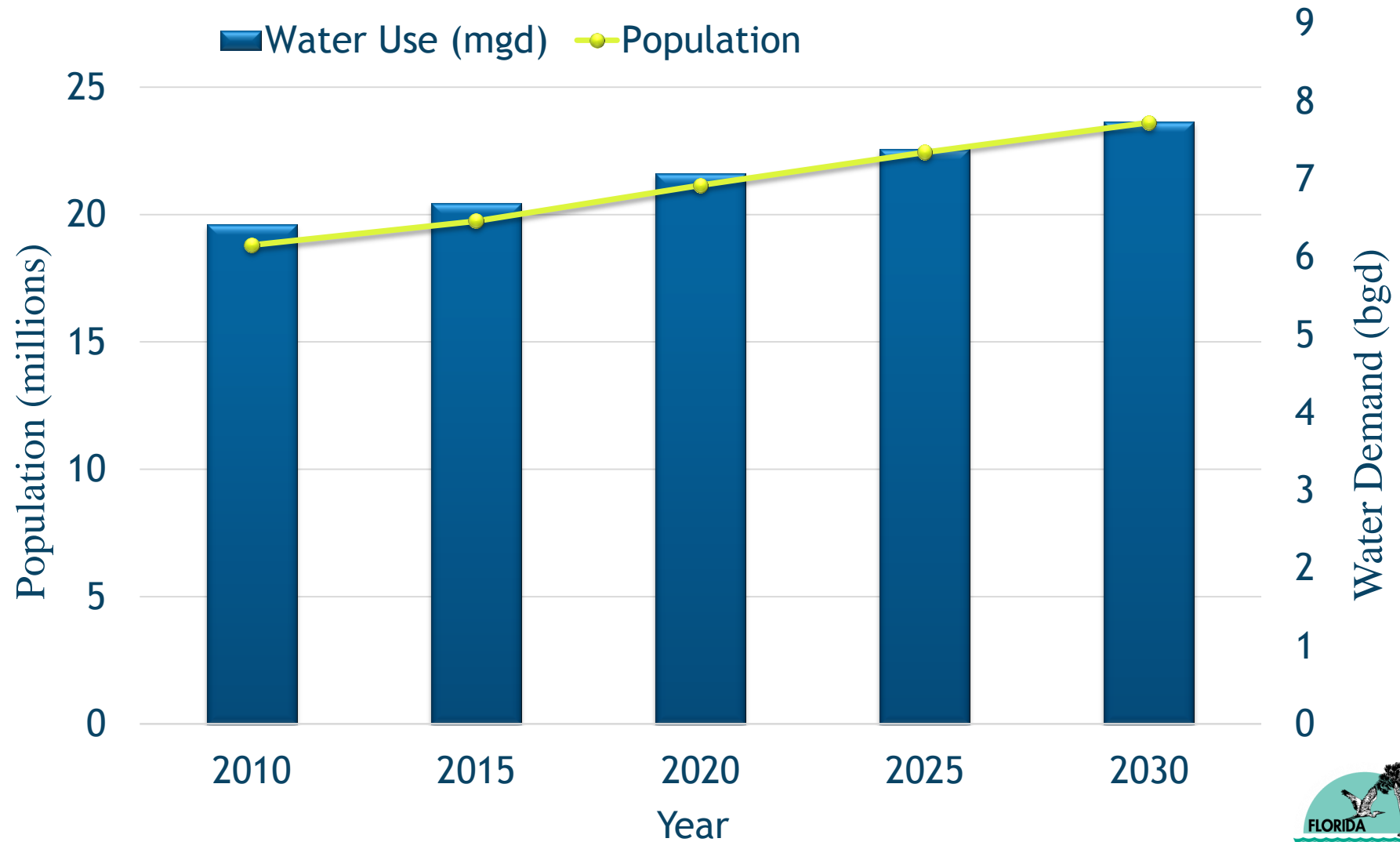
Florida's Reuse Growth



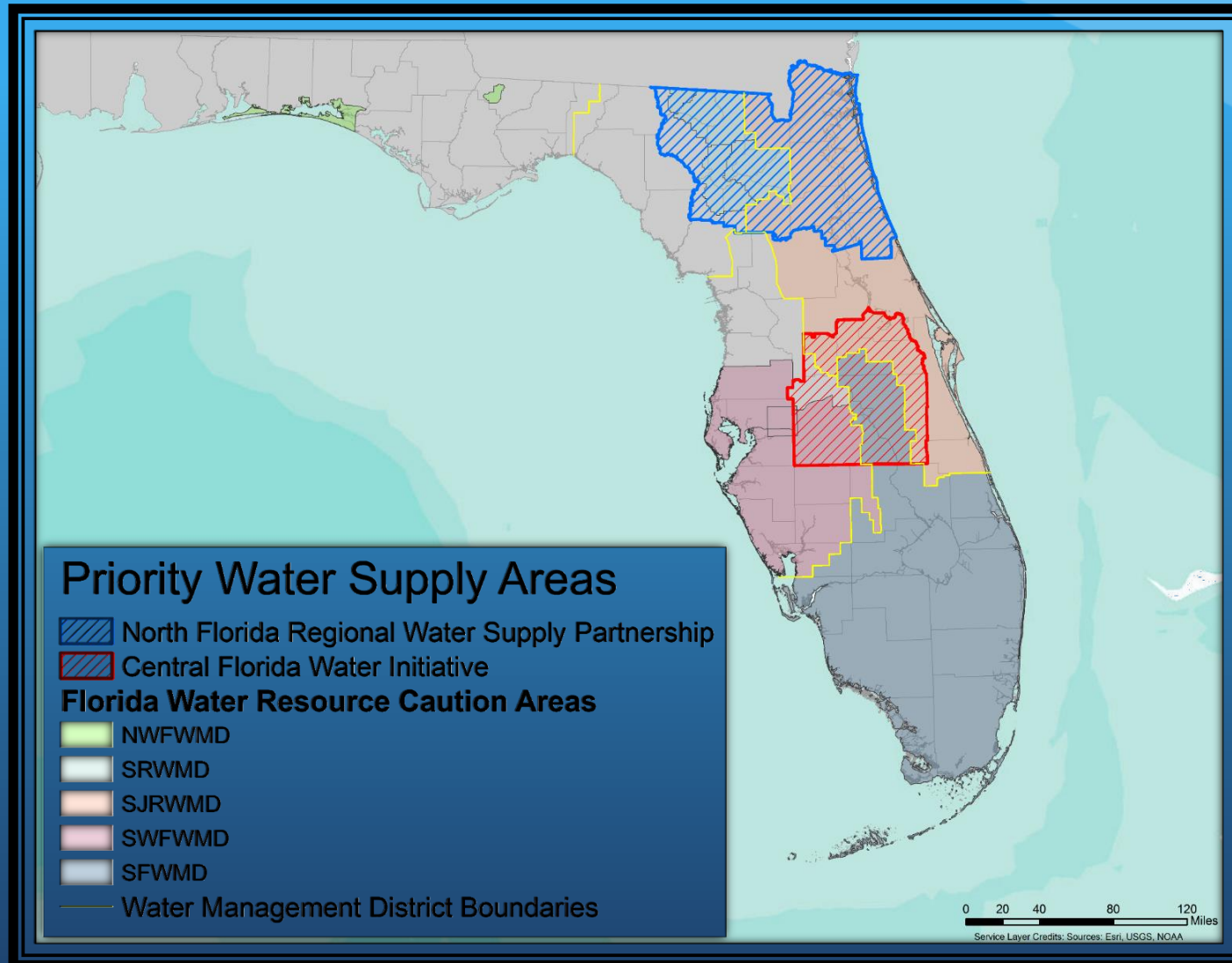
Reclaimed Water Use by Flow, 2011



Florida Population & Demand Projections



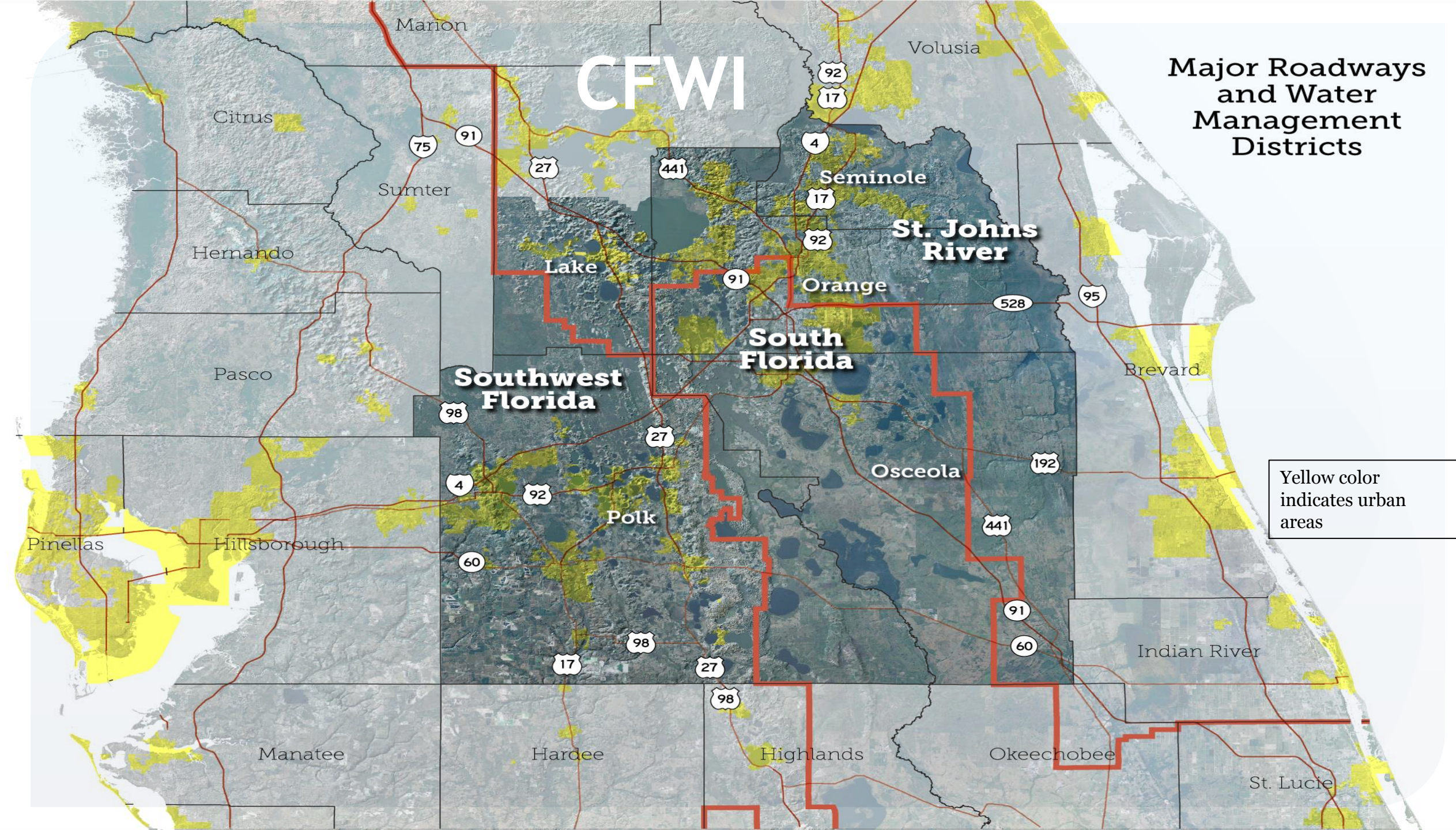
Water Supply Areas



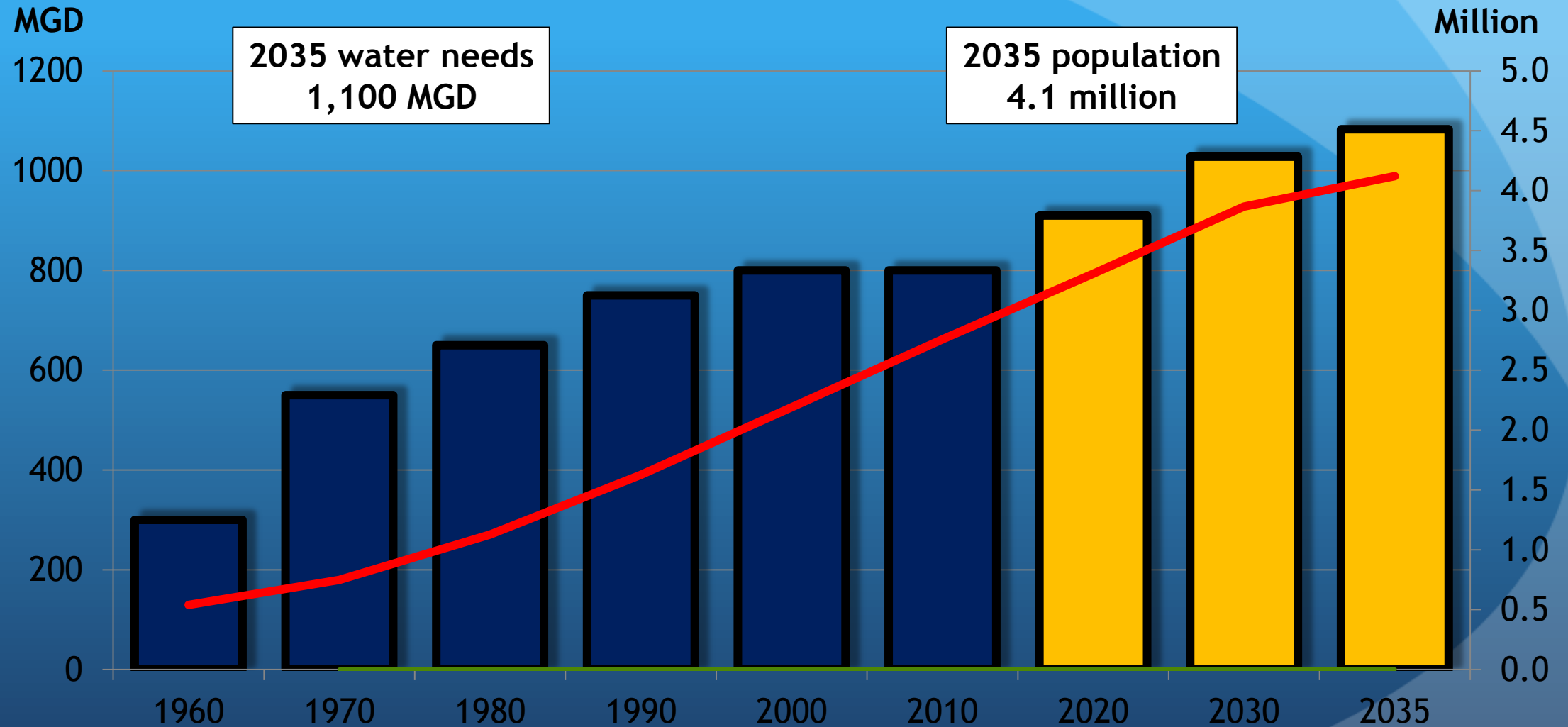
CFWI

Major Roadways and Water Management Districts

Yellow color
indicates urban
areas



CFWI Water Needs/ Population



CFWI Planning Horizon Metrics

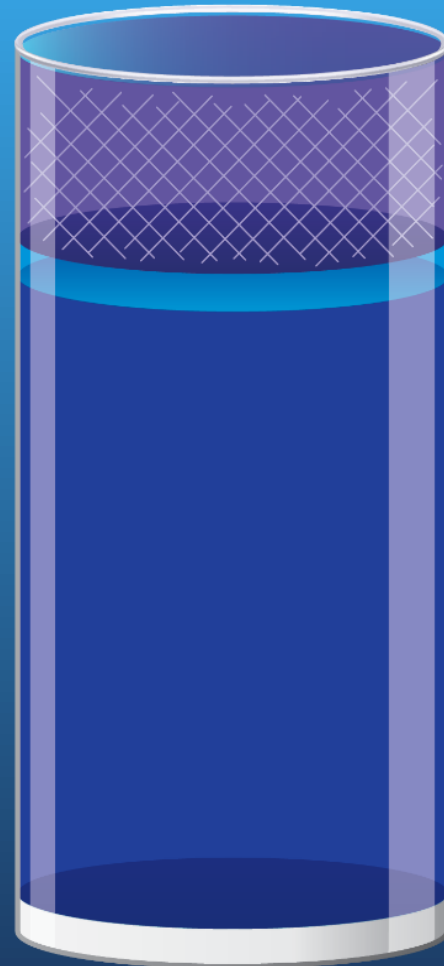
Population

- 2015- 2.9 million
- 2035- 4.1 million

RWSP

- 300 MGD need
- 415 MGD potential

1,100 MGD
Total Water Needed (2035)



250 MGD

Needed

AWS+ conservation

50 MGD

Upper Floridan
Groundwater Available

**Fresh Traditional
Groundwater Available**

800 MGD

Current Water Used

1995-2010 Average Water Use

Agricultural Water Use - Florida 2015

Agricultural
Irrigation: 2,132 MGD

Cold
Protection: 97.1 MGD

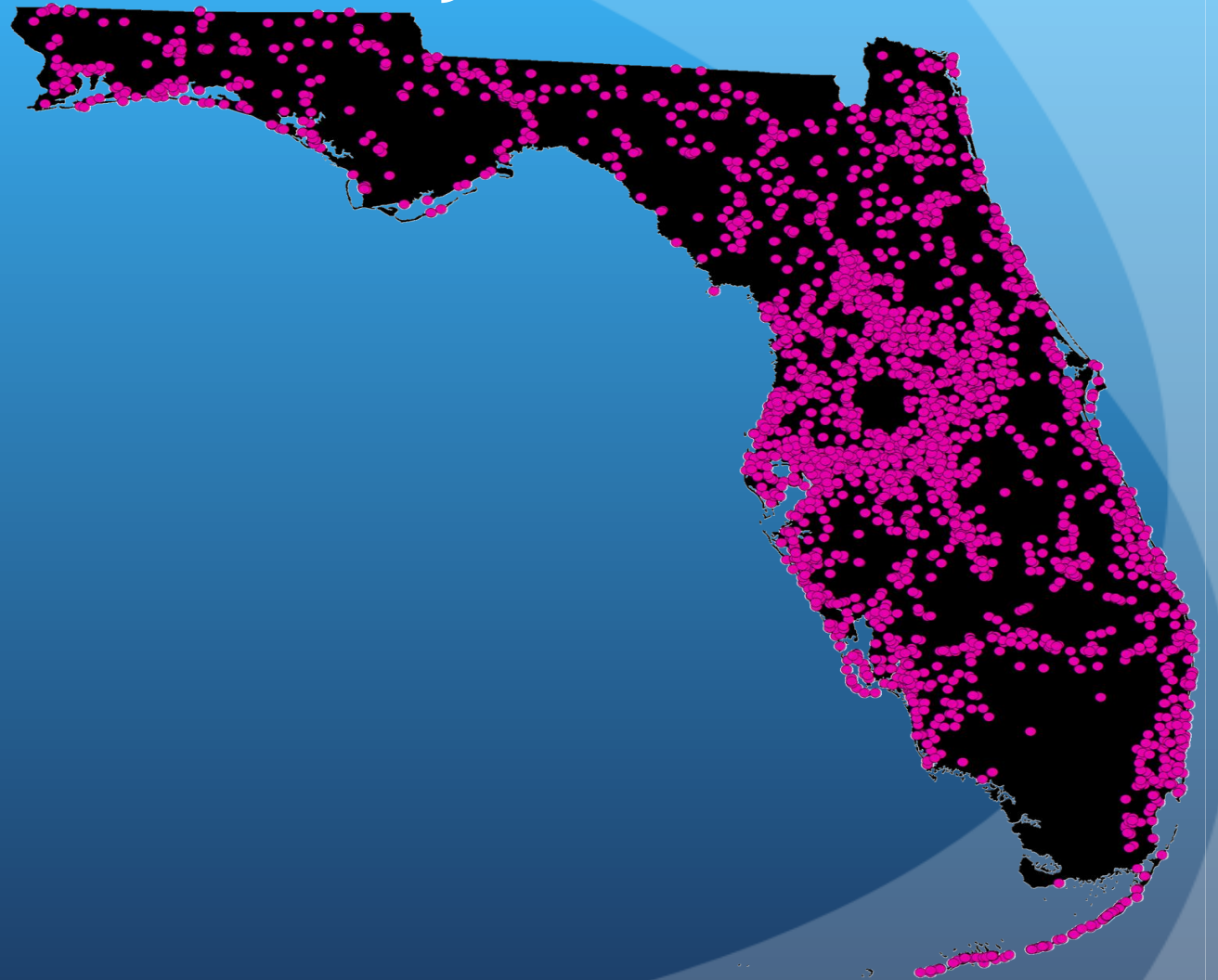
Livestock: 38.4 MGD

Aquaculture: 5.5 MGD



Reclaimed Water Availability

- Domestic Waste Water Facilities with capacities greater than 100,000 gallons per day
 - 3,100+ facilities



Reclaimed Water Availability

Irrigated Agricultural Lands within **5 miles** of a 100,000+ gpd Domestic Waste Water Facility: 1,459,737.87 acres

- 81.1% of the total 2015 Ag Irrigated Acreage

Crop	Acreage	Average Year MGD	Dry Year MGD
Citrus	488,706.47	601.04	691.19
Field Crops	101,082.26	70.11	80.62
Fruit (Non-citrus)	29,357.76	46.84	53.87
Greenhouse/Nursery	61,385.62	113.46	130.48
Hay	94,060.69	86.08	98.99
Potatoes	23,065.22	32.25	37.09
Sod	52,642.36	62.43	71.79
Sugarcane	442,021.73	485.05	557.81
Vegetables (Fresh Market)	167,415.77	255.42	293.73
Total:	1,459,737.87	1,752.69	2,015.59



Ag Reclaimed Water Reality

- No use on Eatable Crops
 - YUCK Factor
- Non-food irrigated agricultural crops within **5 miles** of a 100,000+ gpd Domestic Waste Water Facility: 208,088.67 acres
 - *11.6% of the total 2015 Ag Irrigated Acreage*

Crop	Acreage	Average Year MGD	Dry Year MGD
Citrus	488,706.47	601.04	691.19
Field Crops	101,082.26	70.11	80.62
Fruit (Non-citrus)	29,357.76	46.84	53.87
Greenhouse/Nursery	61,385.62	113.46	130.48
Hay	94,060.69	86.08	98.99
Potatoes	23,065.22	32.25	37.09
Sod	52,642.36	62.43	71.79
Sugarcane	442,021.73	485.05	557.81
Vegetables (Fresh Market)	167,415.77	255.42	293.73
Total:	208,088.67	261.97	301.26



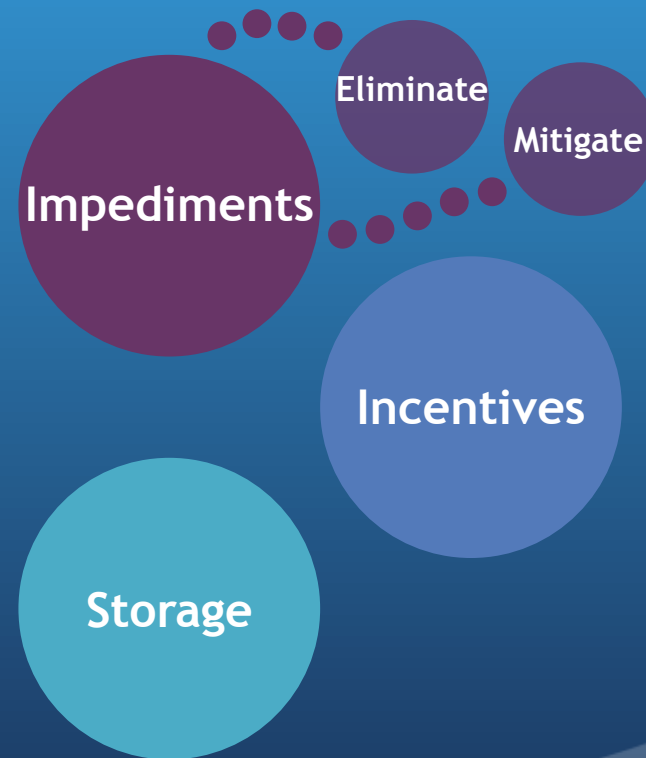
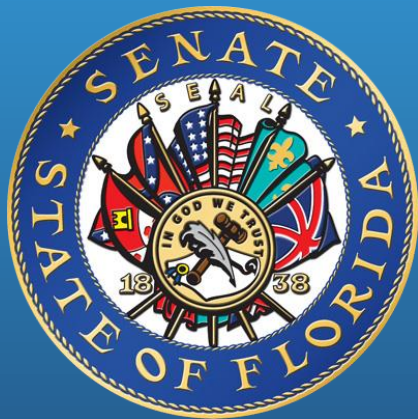
Reasons for Rejecting Reclaimed Water

- Reliability of the water source
- Infrastructure costs
- Loss/Reduction of water use permits
- YUCK factor

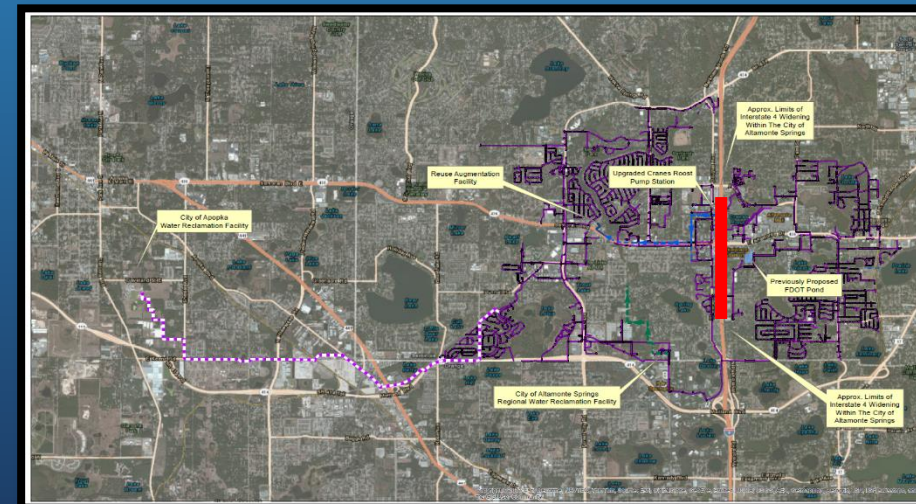


Senate Bill 536

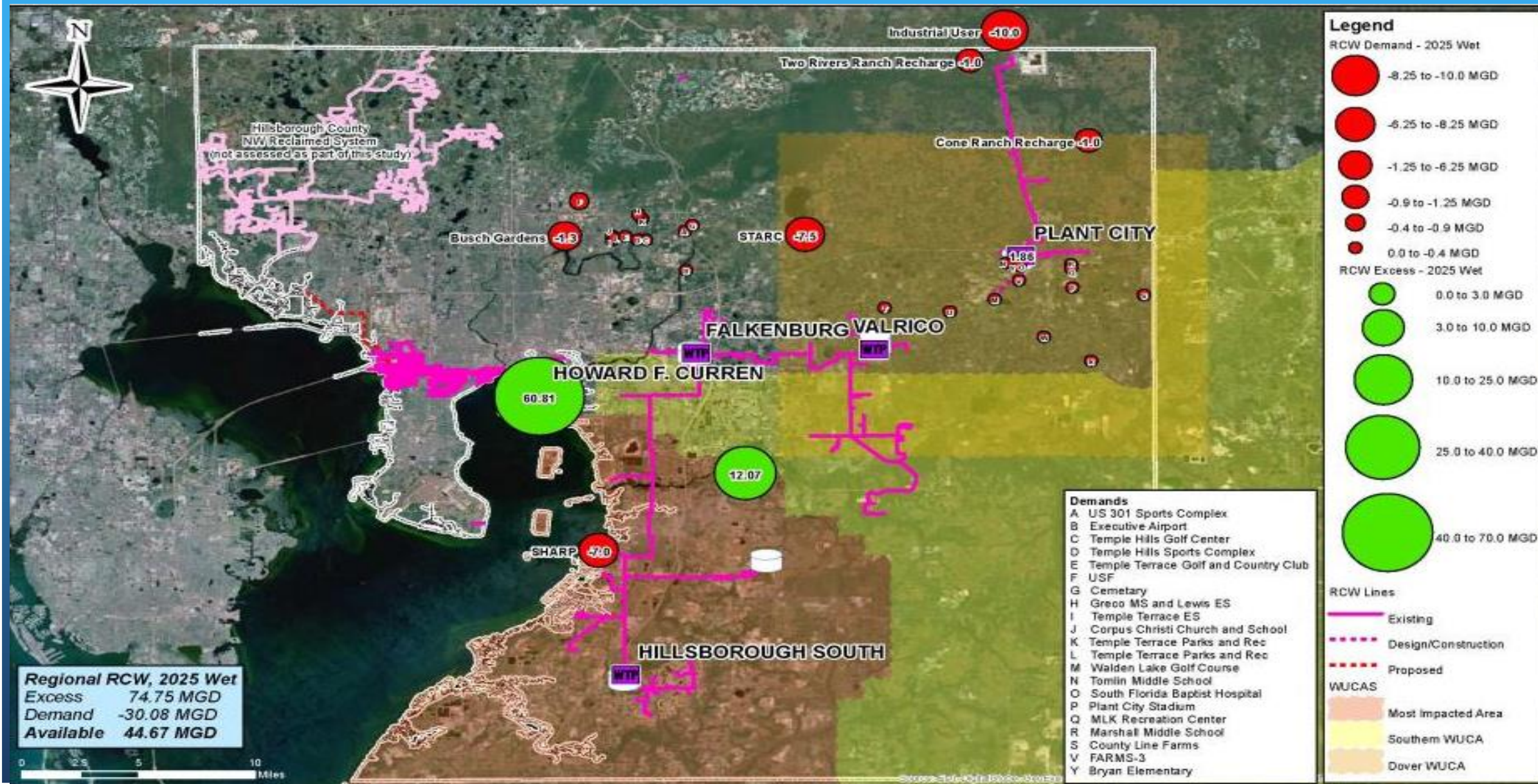
“DEP, in coordination with stakeholders shall conduct a comprehensive study and submit a report on the expansion of the beneficial use of reclaimed water, stormwater, and excess surface water in this state.”



Hillsborough, Pasco & Pinellas

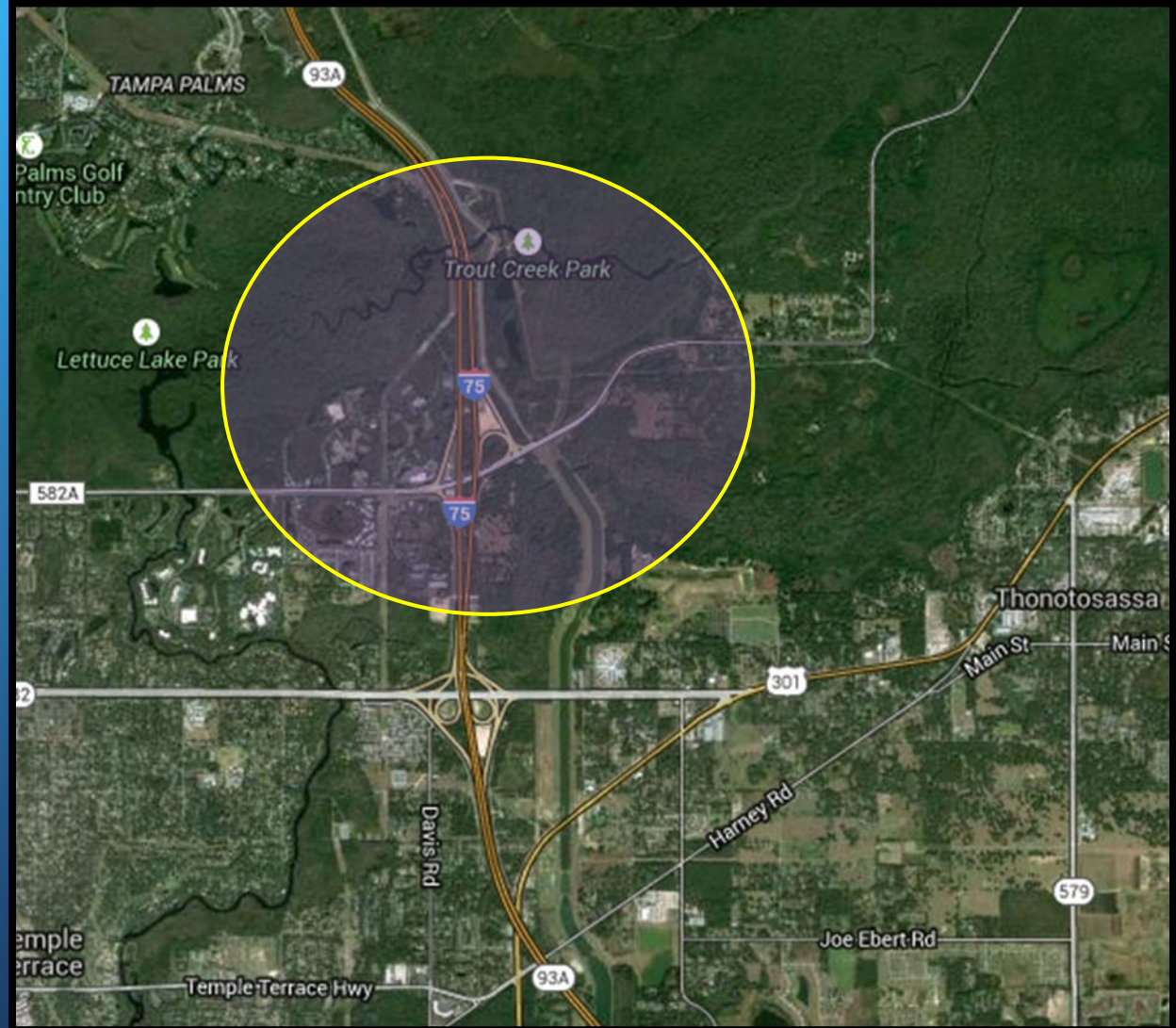


Regional Partnership Reclaimed Supply/Demand



City of Tampa Reclaimed Water Augmentation Project

33

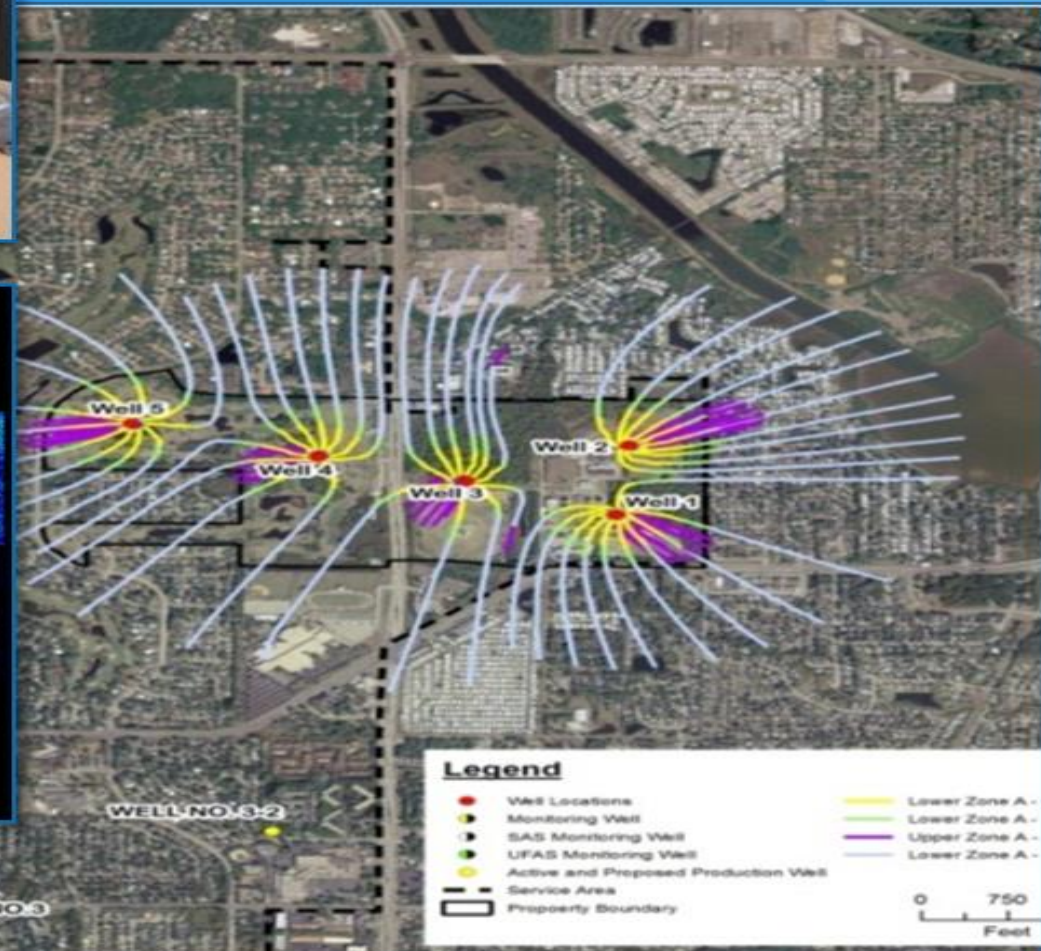
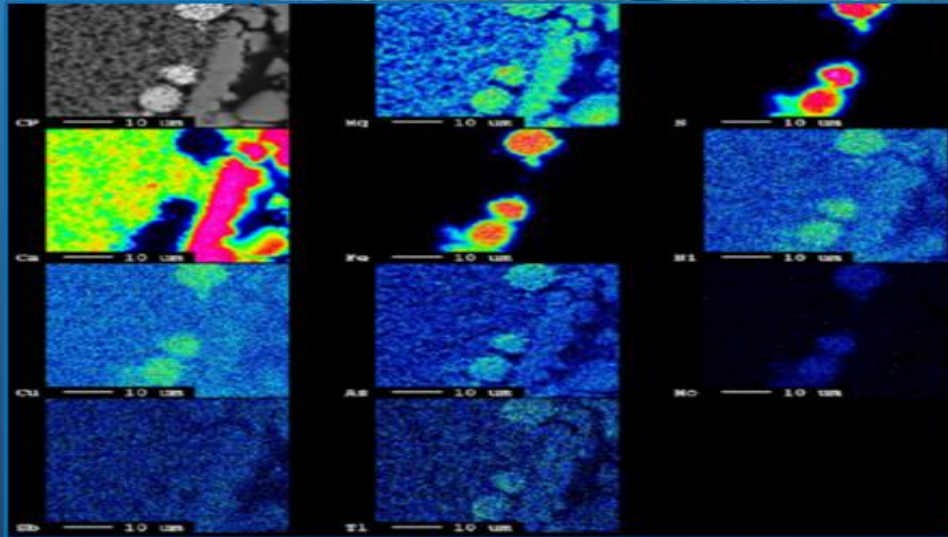
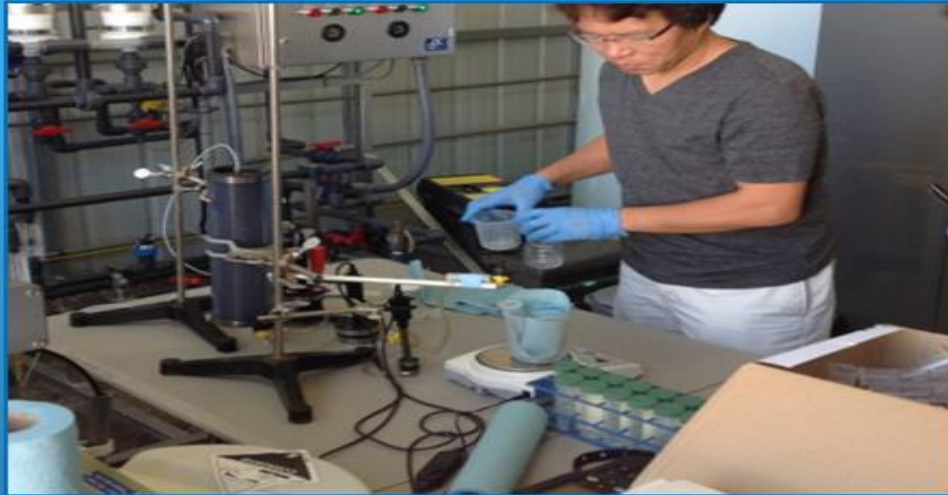


Clearwater Potable Reuse Pilot Testing Process

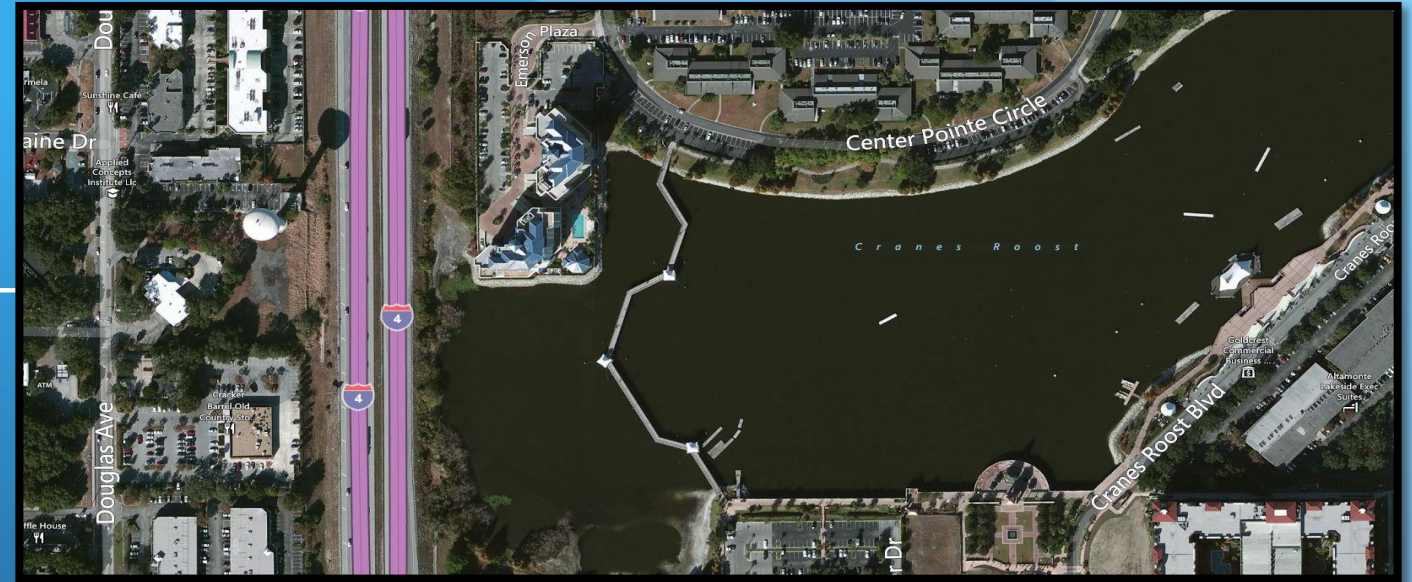
- The full purification and post treatment process was demonstrated at pilot scale
- Duration of 12 months (FDEP, Chapter 62-610)
- More than 25,000 test for more than 200 constituents- pilot facility consistently purified water that met or surpassed all drinking water quality standards



Recharge Testing & Modeling Verification



AFIRST



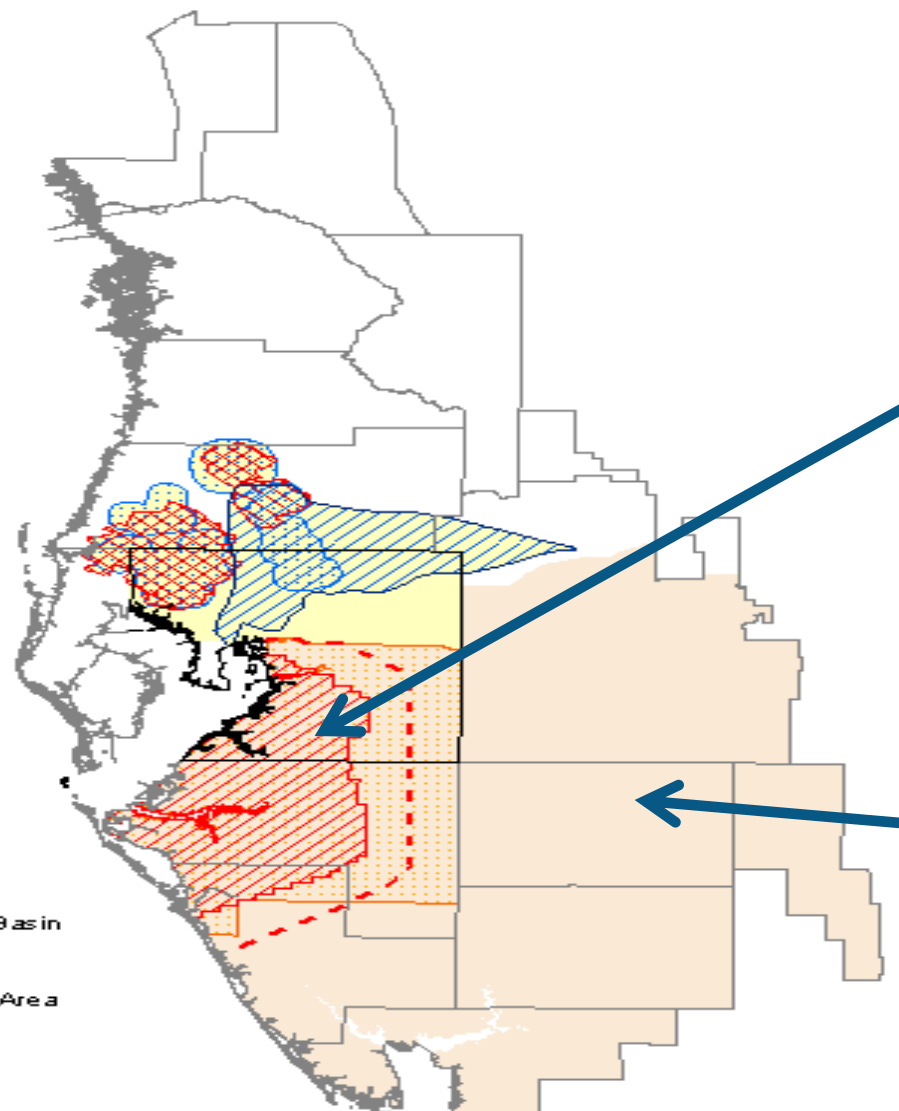
SWUCA Groundwater Impacts



0 11.5 23 46 Miles
1 inch equals 23 miles

Legend

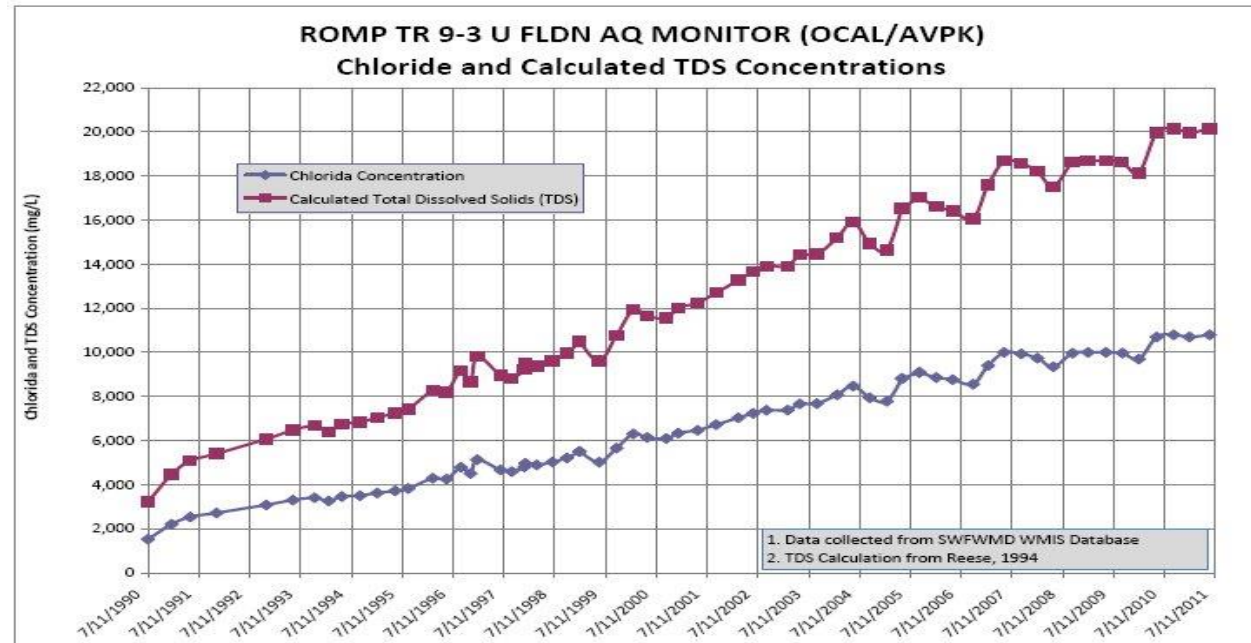
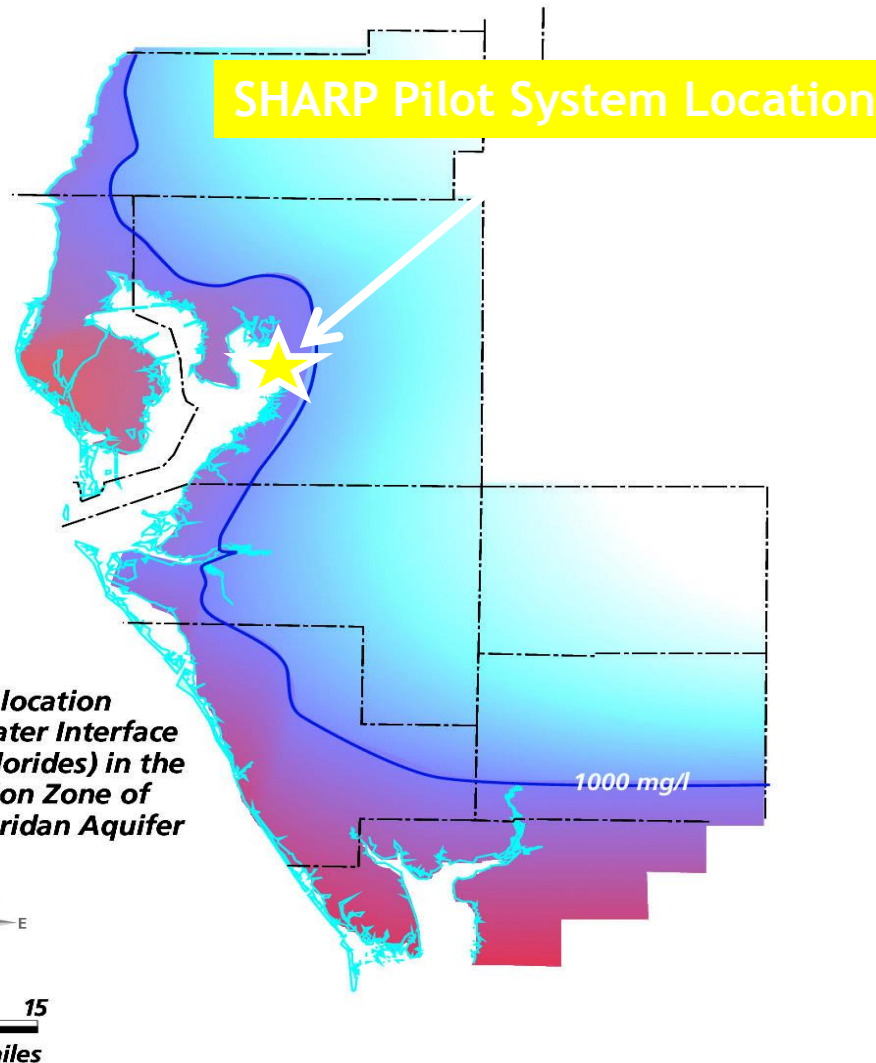
- Hillsborough County
- SWFWMD Boundary
- Most Impacted Area (MIA)
- MIA Impact Buffer
- SWUCA
- Eastern Tampa Bay WUCA
- Hillsborough River Groundwater Basin
- NTB Wellfield Impact Area
- TBW Wellfield Impact Mitigation Area
- NTB Recovery Area



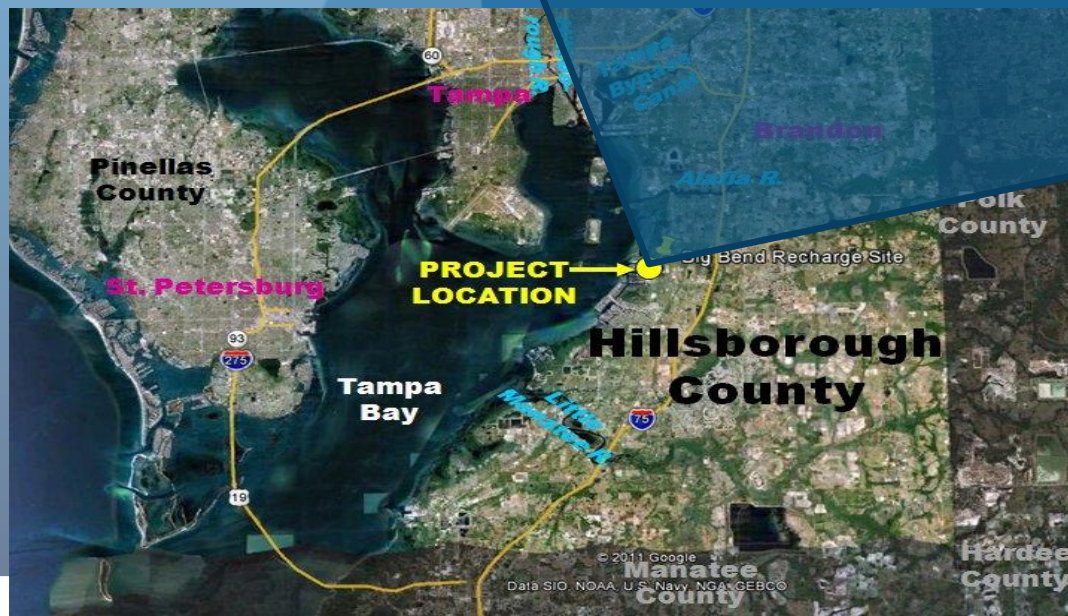
Most Impacted Area
(MIA) of the SWUCA

SWUCA

SHARP Benefit: Mitigate Saltwater Intrusion



SHARP Pilot Project Location

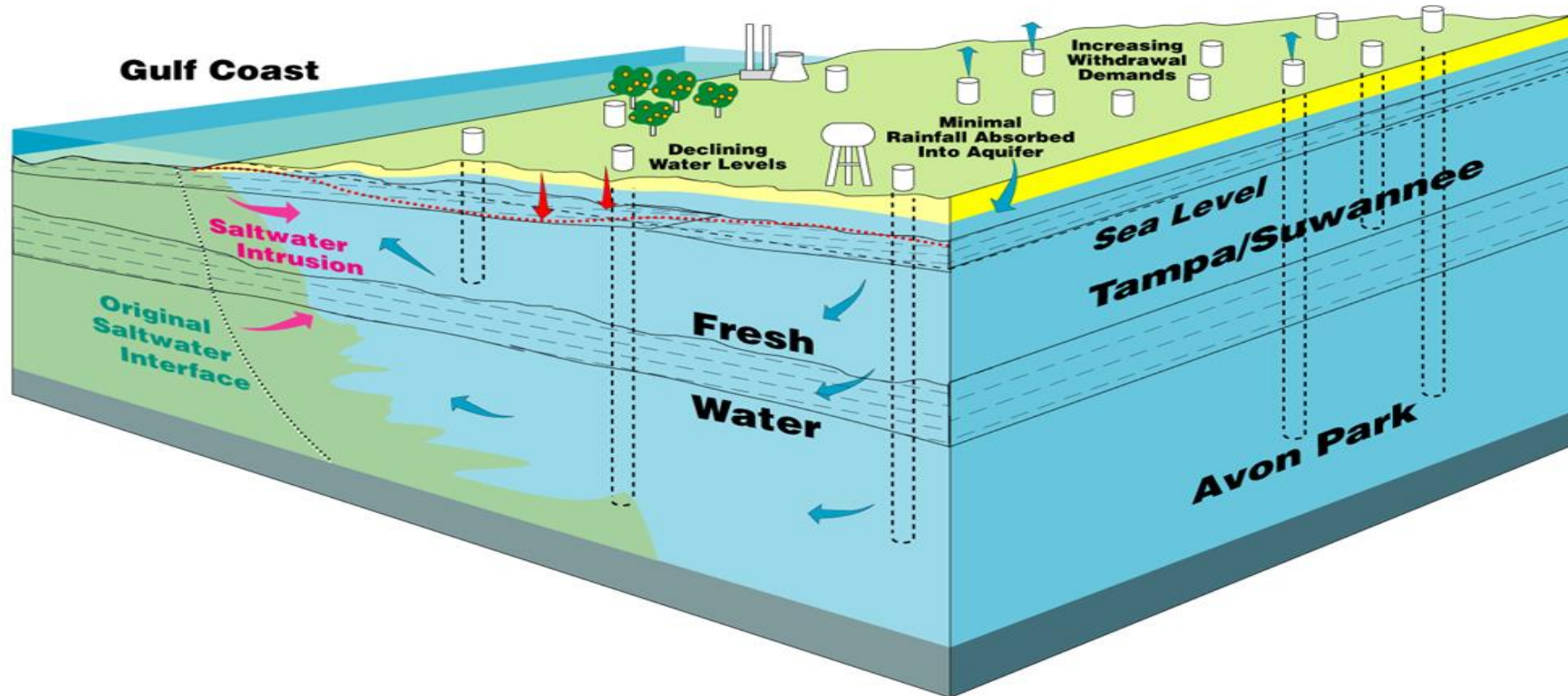


Florida Firsts:

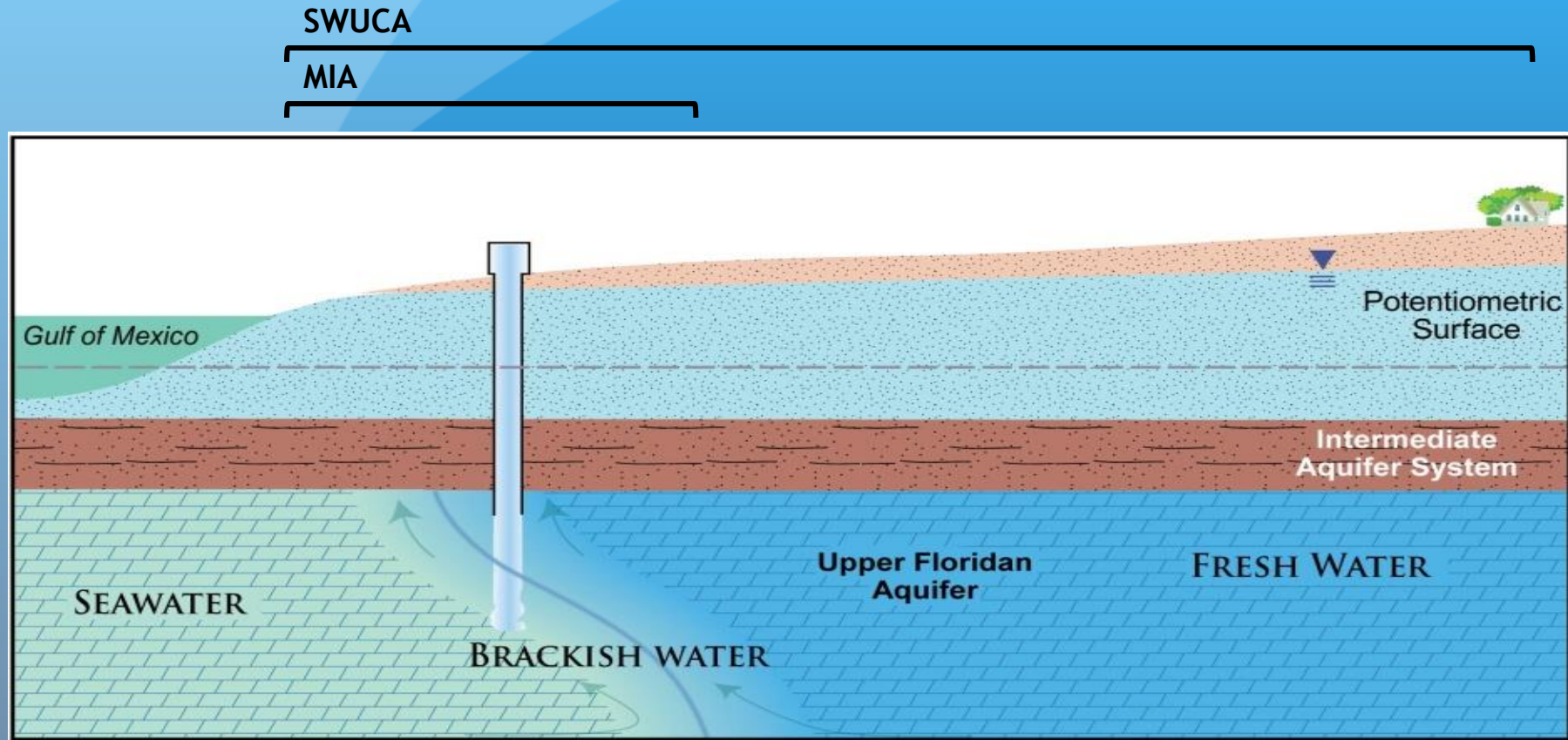
- Permitted Class V Group 2 recharge system for construction
- Operational Class V Group 2 recharge system

Saltwater Intrusion Has Impacted Coastal Florida

Fully Three-Dimensional Model

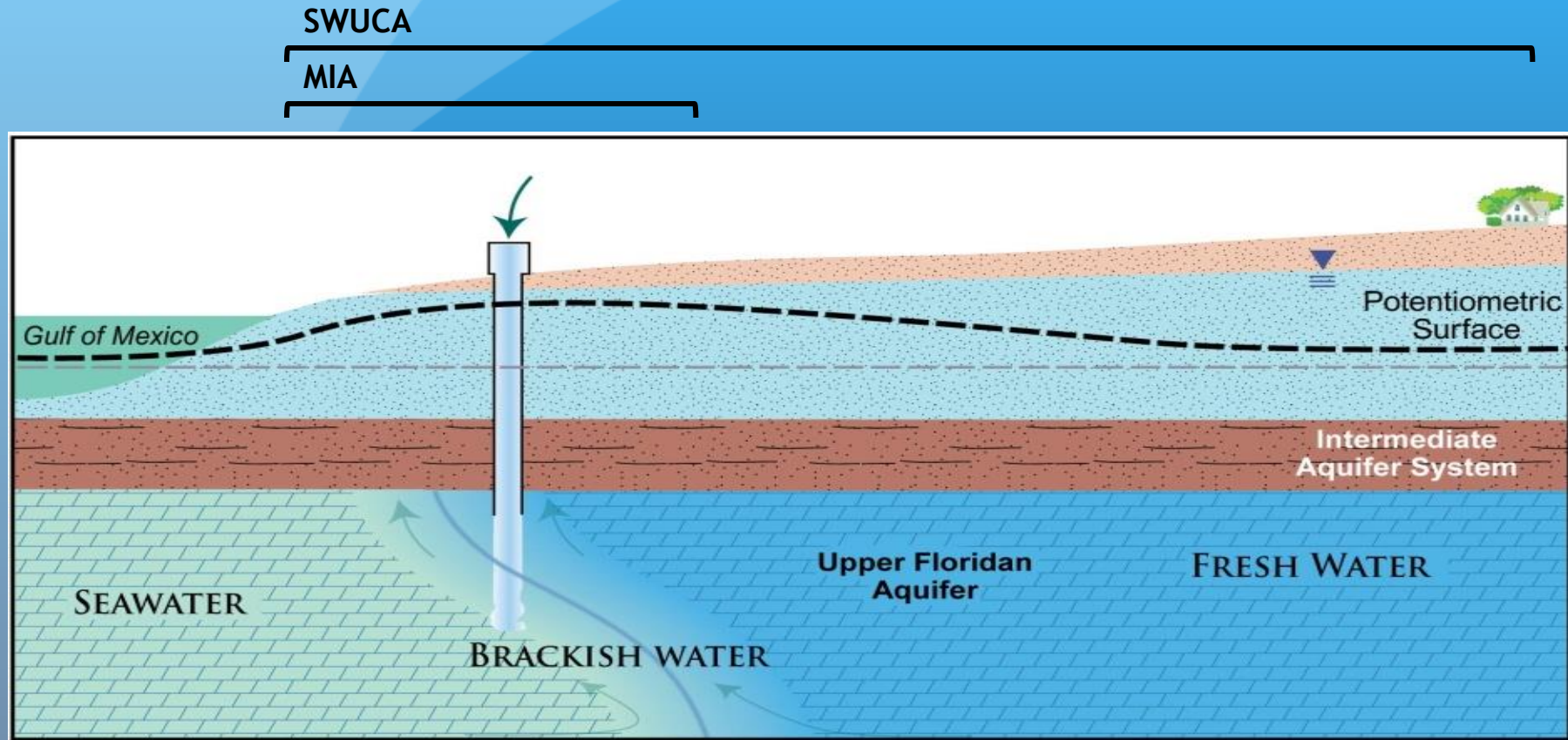


Coastal Aquifer Recharge



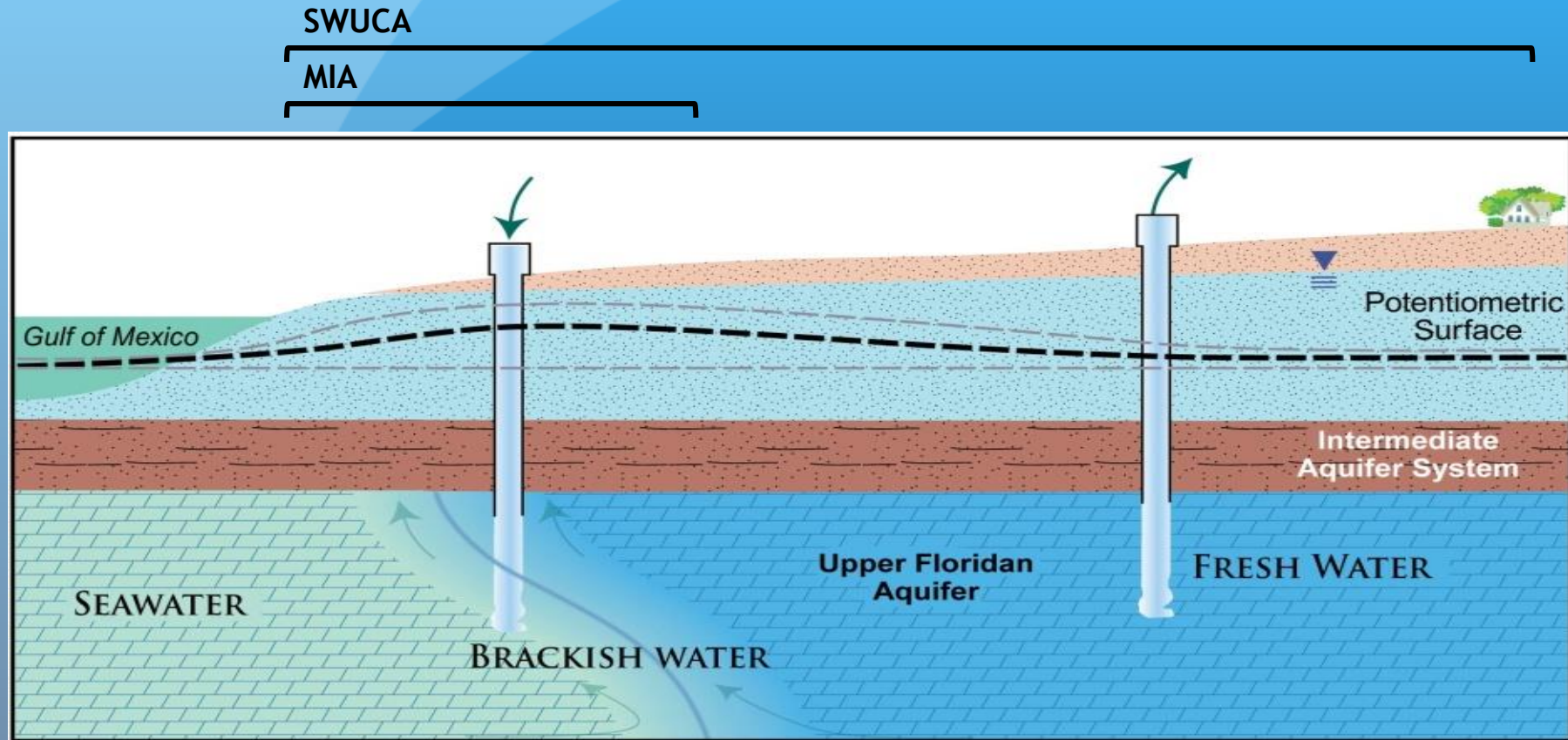
Recharge well is located within the saltwater wedge.

Coastal Aquifer Recharge



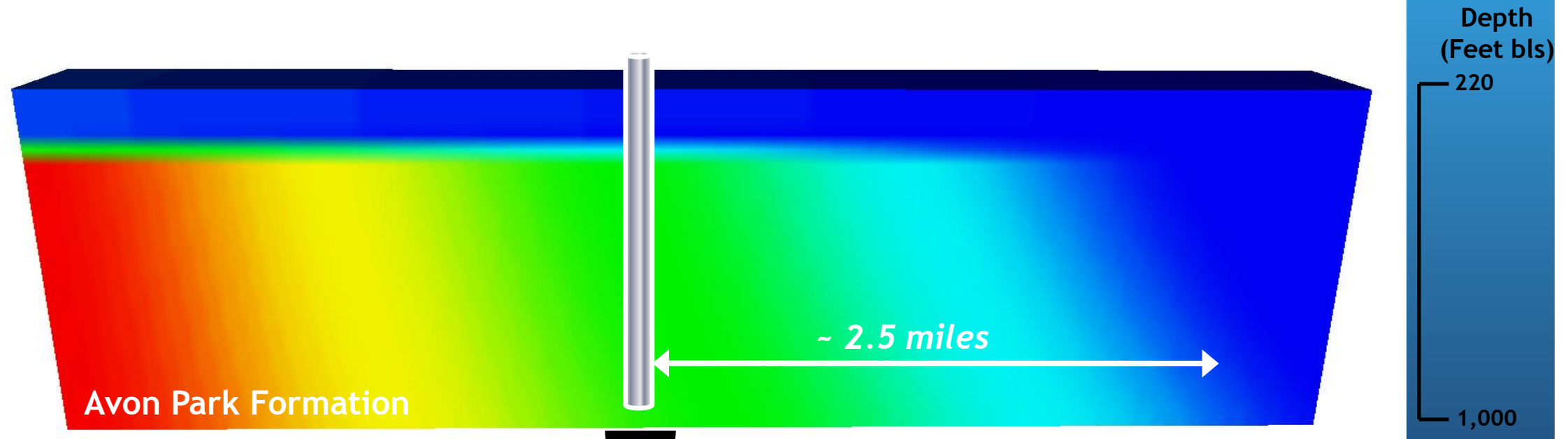
Recharge will cause a mounding of water levels along the coast restoring natural groundwater flow gradients to Tampa Bay.

Coastal Aquifer Recharge



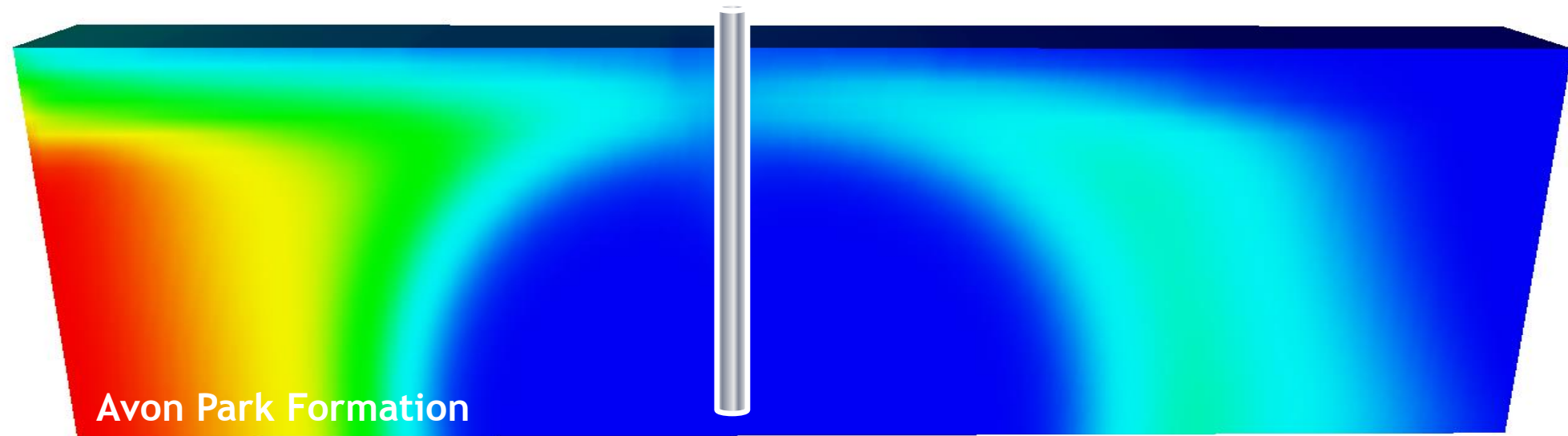
The Recharge water level mounding will allow for future groundwater withdrawals further inland within the SWUCA .

Conceptual Aquifer Recharge Effects (Before Recharge)



Conceptual Aquifer Recharge Effects (After Recharge)

After 1 year of recharge



Depth
(Feet bls)

220

1,000

Red = Saline Water

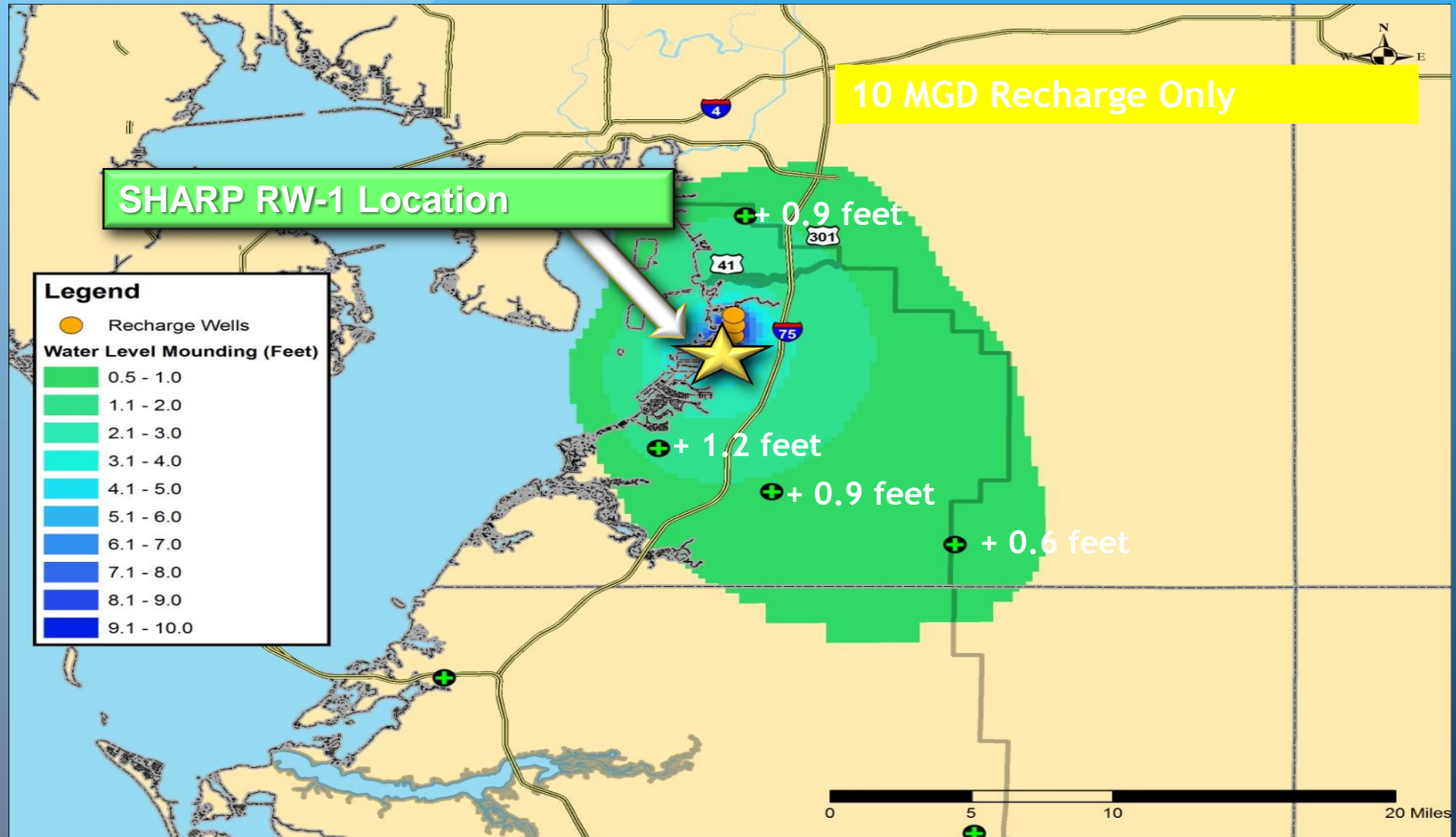
Hillsborough County Indirect Potable Reuse

Southern Hillsborough Aquifer Recharge

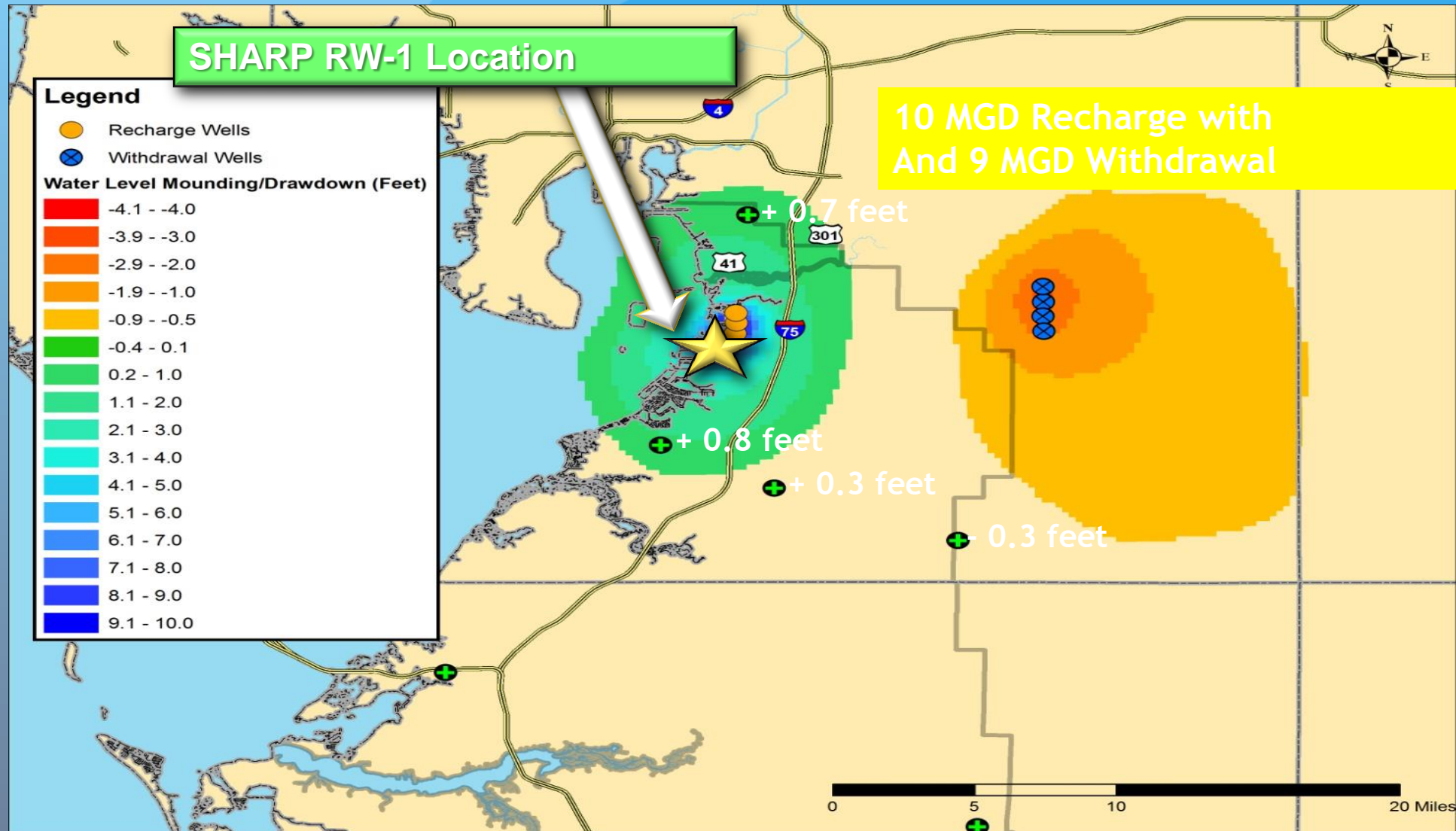
“SHARP”

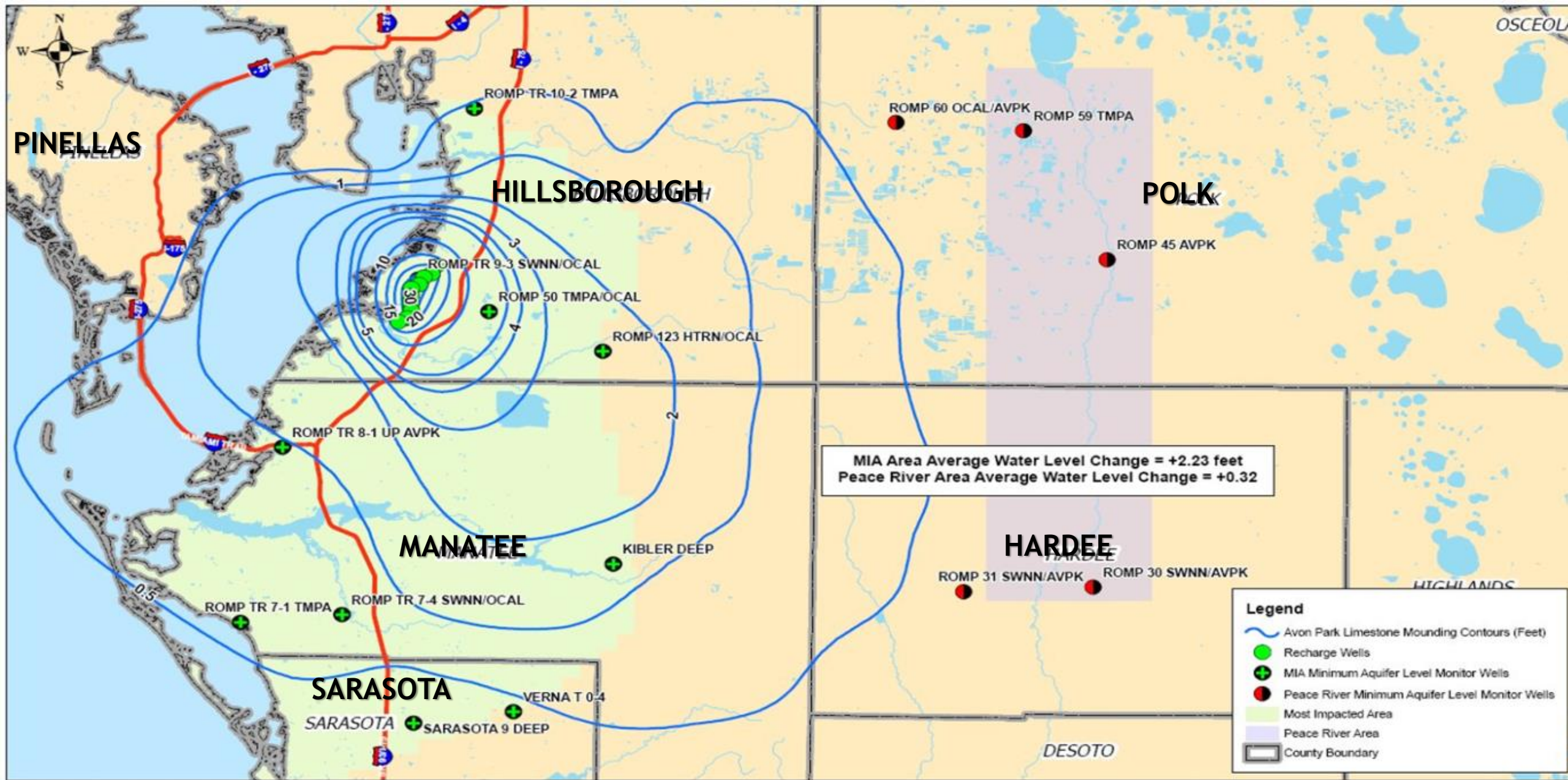


SHARP Benefit: Future Inland SWUCA Groundwater Supply

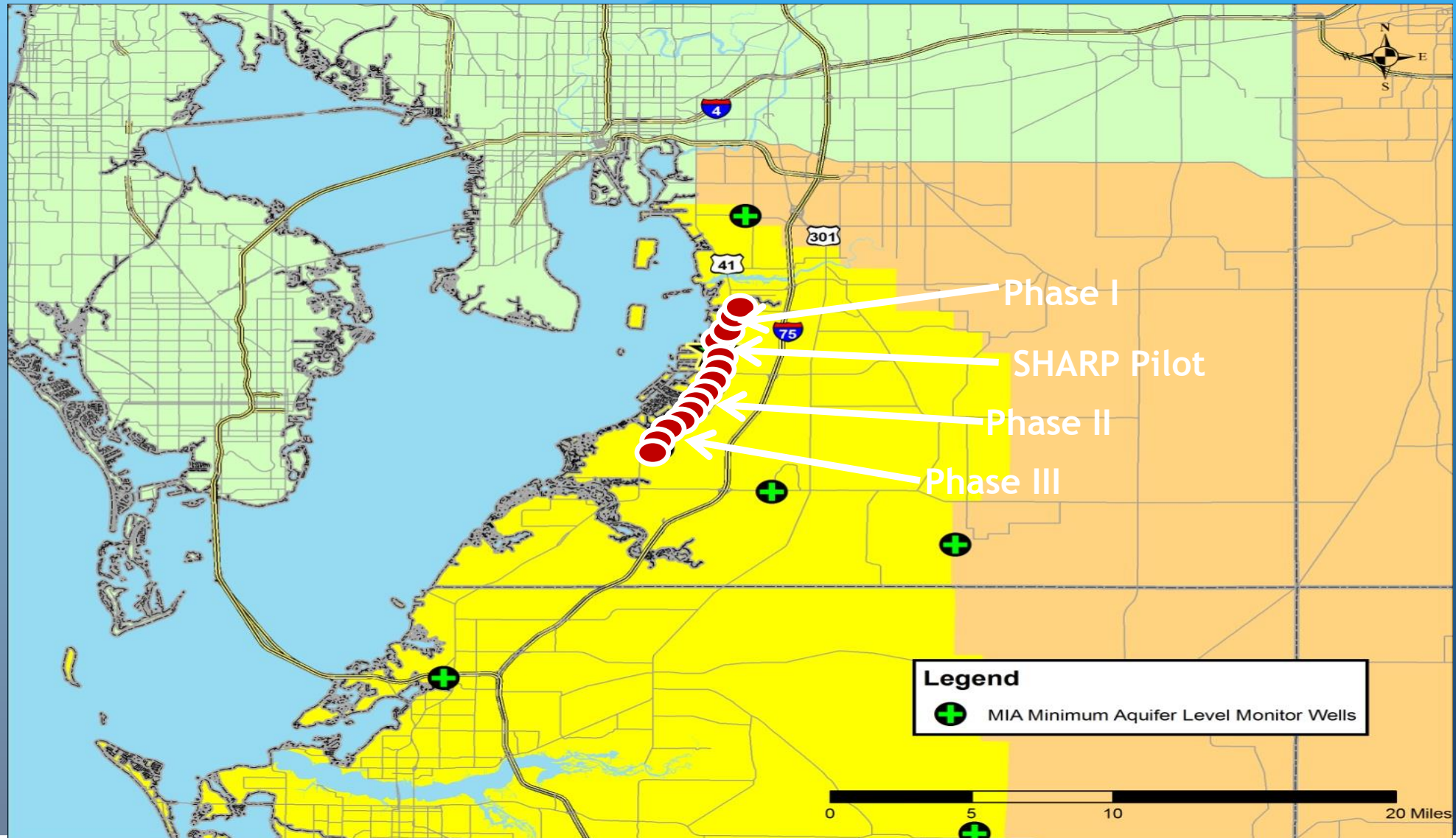


SHARP Benefit: Future Inland SWUCA Groundwater Supply





SHARP Future Phases





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WATERSIDE HOTEL
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